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TELEGRAPHIC ADDRESS—LANCET, WESTRAND LONDON TELEPHONE NUMBER—GERRARD 5356

No. VIII. of Vol. II., 1916.
No. 4851. Vol. CXCI. LONDON, SATURDAY, AUGUST 19, 1916. Price 6d.

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ABSTRACTS OF

Harben Lectures

ON

RIVERS AS SOURCES OF WATER SUPPLY.

Delivered before the Royal Institute of Public Health

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DIRECTOR OF WATER EXAMINATIONS, METROPOLITAN WATER BOARD.

LECTURE I.

THE lecturer introduced the subject of his lectures in the following words:—"I make no apology for confining my remarks, almost exclusively, to the particular river concerning which my ignorance is least. The river in question occupies a unique place in history, its beauties cannot be surpassed, and it is the main source of water supply to the greatest city in the world. I refer, of course, to the River Thames."

THE RIVER THAMES.

Slides were shown in illustration of the topography and geology of the Thames basin, and of the natural flow of the Thames over a 30-year period. The flow was shown to be highest in February and lowest in September. The intimate relation existing between the rainfall, river flow, and inverted barometric pressure was then considered.

A 20-year period (1891–1910) was then taken, and the flow compared month by month with the rainfall. It was then shown that the heaviest rainfall was in October and the biggest flow of the river in February. Departures from the normal, both as regards flow and rainfall, were dealt with and explanations were given of the "lag" of the river behind the rainfall.

The "surface" or "immediate" effects of rainfall were next considered, and the first section concluded with evidence that curves representing the flow and temperature of the river show an inverse parallelism. Twelve lantern-slides were shown in illustration of the points dealt with.

In the second section the chemical and bacteriological results at Pangbourne, Datchet, and Hampton were carefully compared, and the conclusion was reached that there was no serious difference in the hygienic quality of the river Thames at these three points. It was then pointed out that, assuming this to be correct, the greater availability of water in the lower reaches when the river is low but relatively pure might in itself turn the scale against the choice of up-river intakes. The lecturer explained that, excepting Staines, all the "intakes" of the Water Board were situated in the neighbourhood of Hampton, and this was the site of collection of raw river-water samples for analysis. Four lantern-slides were shown to illustrate the various points raised in this section

Yearly Results for 1906–13.

In the third section the average yearly results as regards rainfall, flow, and chemical and bacteriological records over the eight-year period 1906–13 were dealt with at some length. Next the variations in the individual years were considered. It was pointed out that a wet year is almost necessarily a year of heavy flow of river, unless there is some peculiarity in the seasonal distribution of the rainfall, and a year of heavy flow is apt to be a bad quality year, as judged, at all events, by some of the tests. Usually the curves representing the rainfall, flow, permanganate, turbidity, and colour tests are in fair agreement, but the ammoniacal nitrogen, albuminoid nitrogen, chlorine, and oxidised nitrogen curves differ markedly from the flow curve. The bacteriological results are sometimes in agreement with the flow and sometimes the reverse.

The lecturer explained that the apparent discrepancies are due probably to the fact that the yearly flow is influenced not only by the total fall of rain in the year but by its seasonal distribution and periodicity and by the "lag" of the river. Similarly, the quality curves are influenced not only by the average flow throughout the year, but by the manner, for example, in which the floods occur. It was pointed out that the relation between quality and flow is best judged on a half-yearly, quarterly, or monthly basis. Six lantern-slides were shown in this section.

Half-Yearly Results for 1906–14.

In the fourth section, the half-yearly results were considered in detail, over an eight-year period 1906–14. It was shown that there was not much difference between summer (April to September) and winter (October to March), as regards the albuminoid nitrogen test, but that the quality of the Thames was considerably worse during winter, as judged by the following tests:—Oxygen absorbed, turbidity, colour, gelatine count, agar count, bile-salt agar count, and B. coli test.

The individual results were next dealt with, and it was stated that the summer rainfall and flow of river of 1908 exceeded the winter rainfall and flow of river of 1908–09. The albuminoid nitrogen was higher in the summers of 1906, 1907, 1908, and 1911 than in the winters of 1906–07, 1907–08, 1908–09, and 1911–12. The oxygen absorbed from permanganate was higher in the summer of 1908 than in the winter of 1908–09. In all other cases, the rainfall flow, albuminoid nitrogen and oxygen absorbed from permanganate, results were the highest in winter. The turbidity and colour readings were always highest in winter and so were the number of bacteria and B. coli results.

The results as a whole show conclusively that the Thames is much less impure, as judged by these tests, in summer as compared with winter. The conclusion was reached that there is no tangible evidence of a progressive deterioration of the river Thames.

The lecturer then proceeded to answer the question: Why is the Thames apparently purer in the summer than in the winter months? He pointed out that during the winter the floods wash all sorts of impurities into the river, as, for example, from flooded sewage farms and storm sewage overflows. Moreover, the velocity of the river stirs up its bed and prevents the deposition of suspended matters. On the other hand, in the summer much of the water in the river is derived from underground sources and is virtually stored and filtered water. Again, the storm water sewage overflows, which in flood time discharge unpurified or imperfectly purified filthy water into the river, are no longer, or less often, in operation. Moreover, many of the sewage farms may be practically dried up and the effluents may not be discharging directly into the river. These effluents may indirectly reach the river lower down, but only after preliminary purification and mixture with underground water. Again, the slow flow of the river no longer disturbs its bed, and any suspended matters in the water are constantly being deposited in the more stagnant reaches.

Four lantern slides were shown in illustration of the points dealt with.

Quarterly Results for 1906–13.

In the fifth section the quarterly results over the period 1906–13 were considered, first as averages and then in relation to the 32 quarters individually. It was indicated that the autumn and winter rains appear to dominate the winter and spring flow of the river. The albuminoid nitrogen curve is peculiar, inasmuch as although it is at its highest in winter, the spring fall is followed by a summer rise, and the lowest results are encountered in the autumn. The oxygen absorbed, colour, and turbidity curves follow the flow curve somewhat closely. The results are highest in the winter and lowest in the summer. There is no very striking difference between the spring and autumn results, and in this respect they differ from the flow curve, which is much higher in the spring than in the autumn. Having regard to the much greater volume of water in the river, the spring quarter is obviously, as judged by these three tests, a better season for abstraction purposes than the autumn.

Next, the bacteriological results were dealt with, and it was pointed out that they agreed well with the flow curves. The results are worst in winter, then in autumn, next in spring, and the summer quarter is the best. A striking feature is, that although the results are somewhat worse in autumn than in spring, the flow of the river is vastly greater in the spring as compared with the autumn.

Lastly, the 32 quarters were dealt with individually as regards flow, albuminoid nitrogen, oxygen absorbed, colour, turbidity, bacterial counts, and B. coli test. As regards the latter test, it was indicated that the best results have

invariably been in the summer quarter. The section was copiously illustrated by means of 10 lantern slides.

Monthly Results.

In the sixth section the monthly results, as regards rainfall, flow and chemical and bacteriological records, were considered at great length. It was shown that the ammoniacal nitrogen curve agrees fairly well with the flow, but it reaches its minimum in May, whereas the flow reaches its minimum in September. The albuminoid nitrogen curve does not agree very well with the flow curve. The oxygen absorbed, turbidity, and colour curves agree very well with each other and with the flow curve. The results are lowest in September and highest in December. Curves representing the flow, gelatine, agar, and bile-salt agar counts and the B. coli test are in broad agreement with each other, although they also exhibit certain points of dissimilarity. The B. coli results are practically the same in January and December, whereas the gelatine, agar and bile-salt agar *counts* are much worse in the latter month. Considering all the results together, May would seem to be the best month of the year. The drop in the agar and bile-salt agar *counts* in February is very striking.

The lecturer then dealt with the bacteriological tests separately. As regards the gelatine *counts* the best months are May, June, July, and September. In April, although the flow is still above the average, the number of bacteria is 35·4 per cent. below its average. In October and November the flow of the river is still below the average, whereas the gelatine count is almost up to the average in October and 37·7 above the average in November. December is far the worst month of the year.

The agar and bile-salt agar curves were shown to follow each other very closely. The best results occur in May, a rise occurs in June and a slight fall in July; another rise is seen in August, and September shows another fall. The abrupt rise in October is far in advance of the rise in the flow of the river. The results are much the worst during December.

As regards the B. coli results, these are very nearly the same in December and January. In April the results are 13·43 per cent. better than the average, although the flow still remains slightly above the average (2·6 per cent.). There is not much difference between the May and September results, although July is slightly the best month. After September the results deteriorate more rapidly than the flow of the river increases.

The lecturer then showed, in relation to the flow, combined chemical and combined bacteriological curves, and pointed out that they fall at the beginning of the year much more rapidly than the flow curve. Conversely, they rise much more rapidly than the flow curve at the end of the year. In other words, improvement in quality precedes decreased flow, and deterioration takes place in advance of increased flow. Having regard to the large volume of water still flowing in the river in April and May, the chemical and bacteriological results are very satisfactory from a water-works point of view.

It was next pointed out that during the winter months there is a frequent oscillation of the flow and quality curves produced by the more or less immediate or surface effects of the heavy rain, although this does not affect the fact that the general curves of quality and flow are dominated by the rainfall of a much earlier period.

No fewer than 15 lantern slides were shown in illustration of this section.

LECTURE II.

THAMES WATER IN RELATION TO PATHOGENIC BACTERIA.

Dr. Houston in his seventh section showed that, as judged by the streptococcus test, Thames water did not contain 1 part of fresh excremental matter in over 22 million parts of water. From this he proceeded to consider the question of the possible presence of the typhoid bacillus and Gärtner's bacillus in river water. Excepting two typhoid-like microbes, and one Gärtner-like microbe, all his elaborate researches, involving the study of over 22,000 microbes, yielded negative results. Dr. Houston found that on the average he could count on the isolation of the typhoid bacillus and Gärtner's bacillus from *artificially* infected samples of river water, where these microbes were present in the proportion of 1 per 9 c.c. and 1 per 19 c.c. respectively. His failure to find these bacteria in otherwise comparable but *non-infected* samples led him to conclude that these microbes cannot be present in river water in the proportion first stated. Seeing that it can easily be proved by the B. coli test that the river water is improved over 1000 times by the purification processes employed, the lecturer concluded that these pathogenic bacteria could not be present in the water as supplied to consumers in the proportion of 1 per 9000 and 1 per 19,000 c.c. respectively.

Dr. Houston showed microphotographs of the two typhoid-like bacteria and the Gärtner-like microbe, and he then proceeded to show that by the bacteriological examination of sewage we could determine the status of any water-supply as regards the number of cubic centimetres presumably free from the typhoid bacillus. Briefly, by comparing infected (with known numbers of typhoid bacilli) with non-infected samples of sewage, the conclusion was reached that the typhoid bacillus cannot be present in 0·00066 c.c. of sewage, which contains 704 excremental bacteria. The figure of 704 thus becomes the criterion figure for judging the probable specific qualities of water-supplies. For, if 0·00066 c.c. of sewage contains no typhoid bacilli, then whatever volume of any water-supply, containing no more than 704 excremental bacteria, cannot reasonably be supposed to harbour the typhoid bacillus in that volume. For example, the Thames contains 704 excremental bacteria in 15 c.c., and as the water is purified 1000 times, as judged by the B. coli test, the inference is that the typhoid bacillus is not present in 15 litres of the water as supplied to consumers.

"RESISTANCE TO FILTRATION."

In his eighth section the lecturer dealt with the "resistance to filtration" of Thames water and the microscopical appearances of its suspended matter. By resistance to filtration is meant the degree to which the suspended matters (living and dead) in a water interfere with its filtration by "blocking" the filtering material. Having explained the means adopted for testing this point, an ingenious method was next described of obtaining permanent qualitative and quantitative photographic records of the suspended matter in the water.

It appears that *raw* Thames water filters fairly well on the average, but in the spring and winter the results may be widely different. Photographs were first exhibited showing that during summer the water filters well, owing to the comparative absence of suspended matter. Next, some winter "flood" results were shown, and the change in appearance was so striking as easily to explain the wide difference in the observed filtration results. Then the spring results were illustrated, and here, apparently, we have to deal with algal growths as well as with amorphous organic and inorganic matters.

STORAGE OF RIVER WATER PREVIOUS TO FILTRATION.

In his ninth section Dr. Houston described some of his now well-known researches on the vitality of the cholera vibrio and the typhoid bacillus when artificially added to river water in enormous numbers. He concluded that storage was inimical to the prolonged vitality of these pathogenic bacteria, and he drew an important distinction between "cultivated" and "uncultivated" microbes. It appears that the latter die much more speedily than the former in river water under conditions of storage.

Next, in his tenth section, the lecturer summarised his prolonged researches on the advantages of storing river water in reservoirs antecedent to filtration. Taking the Chelsea reservoir as an example, Dr. Houston explained that the percentage reduction (due to storage) in the gelatine, agar, and bile-salt agar count was about 95, 84, and 88 respectively. As judged by the B. coli test, the water was improved at least 100 times. For example, 48·3 per cent. of the samples of river water yielded positive results with 0·1 c.c. of water, whereas only 32·5 per cent. samples of stored water yielded positive results with 100 times as much water—namely, 10 c.c.

Dealt with as actual figures, the gelatine count was reduced from 4465 to 208, the agar count from 280 to 44, and the bile-salt agar count from 41 to 5. Chemically, the reductions effected by storage were as follows:—

Ammoniacal nitrogen	63·4 per cent.
Albuminoid ,, ...	29·4 ,,
Permanganate test	27·8 ,,
Turbidity ,, ...	84·9 ,,
Colour	45·8 ,,

Turning next to the Staines and Lambeth reservoir results, it was pointed out that the river water before storage contained B. coli in 0·1 c.c. (or less) in 53·2 per cent. of the samples examined. After storage in the Staines reservoirs, about the same number (56 per cent.) of samples yielded positive results with 100 times as much water—namely, 10 c.c. The Lambeth (Island Barn) results were not quite so good, but were still very striking.

The percentage reduction in the bacterial counts were as follows:—

	Staines.	Lambeth.
Gelatine count	87 per cent.	89 per cent.
Agar count	64 ,,	64 ,,
Bile-salt agar count	91 ,,	86 ,,

The percentage reduction in the chemical results consequent upon storage were:—

	Staines.	Lambeth.
Ammoniacal nitrogen	18·6 per cent.	29·3 per cent.
Albuminoid nitrogen	6·72 ,,	Slight apparent increase.
Permanganate test	27·5 ,,	17·7 per cent.
Turbidity	66·4 ,,	73·1 ,,
Colour	45·2 ,,	42·1 ,,

The percentage number of samples, in the case of other reservoirs, yielding positive results with 1 c.c. (or less) of water, as judged by the B. coli test, was as follows:—

River Thames	95·0 per cent.
Walton reservoir	22·6 ,,
West Middlesex No. 1 Reservoir	35·2 ,,
,, ,, ,, 3 ,,	35·3 ,,
,, ,, ,, 4 ,,	39·4 ,,
,, ,, ,, 6 ,,	45·4 ,,
Sunbury reservoir	54·9 ,,
Grand Junction (Hampton) reservoir	19·5 ,,
,, ,, (Kew) ,,	33·4 ,,
Kempton Park	13·0 ,,

Conclusions in Regard to Storage of River Water.

The lecturer's conclusions (under this section) were as follows:—

1. Storage reduces the number of bacteria of all sorts, the number of bacteria capable of growing on agar at blood heat, and the number of bacteria capable of growing in a bile-salt medium at blood heat, chiefly excremental bacteria.
2. Storage reduces the number of coli-like microbes and the number of typical B. coli.
3. Storage may alter certain bacteriological river water ratios; for example, it may reduce the number of typical B. coli to a proportionately greater extent than it reduces the number of bacteria of all sorts.
4. Storage, if sufficiently prolonged, devitalises the microbes of water-borne disease (e.g., the typhoid bacillus and the cholera vibrio)
5. Storage reduces the amount of suspended matter, colour, ammoniacal nitrogen, and oxygen absorbed from permanganate.
6. Storage usually reduces the hardness and may reduce (or alter the quality of) the albuminoid nitrogen.
7. Storage alters certain chemical water ratios; for example, the colour results improve more than the results yielded by the permanganate test.
8. Storage has a marked "levelling" effect on the totality of water delivered to the filter beds.
9. Storage tends generally to lengthen the life of the filters. (Only under exceptional conditions is the converse true.)
10. An adequately stored water is to be regarded as a "safe" water, and the "safety change" which has occurred in a stored water can be recognised by appropriate tests.
11. The use of stored water enables a *constant* check to be maintained on the safety of London's water *antecedent* to and irrespective of filtration.
12. The use of stored water goes far to neutralise or wipe out the gravity of any charge that a water-supply is derived from polluted sources.
13. The use of adequately stored water renders any accidental breakdown in the filtering arrangements much less serious than might otherwise be the case.

The lecture was most copiously illustrated with lantern-slides.

LECTURE III.

TESTING THE "RESISTANCE TO FILTRATION."

In his third and final lecture Dr. Houston showed, for the benefit of those not previously present, the methods adopted for testing the "resistance to filtration" shown by various waters, and also the method of obtaining quantitative and qualitative photographic records of the suspended matters present in such waters.

Briefly, 100 c.c. of the sample of water are filtered through four thicknesses of a standard linen tightly bound round the end of a piece of glass tubing, so that the whole of the suspended matters remain as a thin film on the inside of the linen. Tap water (which is practically free from suspended matter) is then filtered, under a constant head, through the linen and the filtrate collected for one minute and then measured. If the original water contains very little suspended matter the skin on the linen is so thin that 200–300 c.c pass through it in the minute. On the other hand, if the original water contains a great deal of suspended matter the skin on the linen is so thick and impervious that very little, or none, of the tap water passes through it. To correlate the "resistance to filtration" results with the appearance of the suspended matter present the lecturer described at some length his methods for obtaining permanent qualitative and quantitative photographic records.

Dr. Houston showed that tap water gave an average "resistance to filtration" figure of 281, and this is to be regarded as the criterion figure for judging all other results. The River Thames gives an average of 112 and shows marked seasonal fluctuations.

PHYSICAL AND BIOLOGICAL CHANGES IN RIVER WATER UNDER STORAGE.

Turning next to the physical and biological changes occurring in river water under conditions of storage, the lecturer showed that reservoirs like the Walton and Chelsea give excellent averages (249 and 228 respectively), and the results are wonderfully uniform throughout the year. In explanation of these figures a series of photographic slides were shown, and it was made apparent that the high filtration figures were due to these reservoirs being relatively free from algal, or other growths, and suspended matters in general.

The Lambeth (Island Barn) reservoir results were next dealt with, and here the average filtration figure was low and the fluctuations during the year very considerable. Beautiful photographs were shown in explanation of the results observed. It was shown that the "falling off" in the results was due to the development of algal and other growths (e.g., Fragillaria, Asterionella, Ceratium, Tabellaria, &c).

Then the Staines reservoir results were considered and their importance may be judged by the fact that this is the source of supply to the Sunbury, Kempton Park, Grand Junction (Hampton and Kew), and West Middlesex works. The average results were not very satisfactory, and in August and September, 1915, and March, 1916, the filtration figures showed a marked "falling off." A series of striking photographs was shown indicating the reasons for these changes. It appears that in August and September the chief offender was Fragillaria, and in March, Asterionella was mostly to blame.

All the reservoirs supplied with Staines water were then considered in detail, as regards filtration results. The Sunbury, Grand Junction (Hampton), Grand Junction (Kew), and West Middlesex reservoirs all gave wonderfully similar results, the average filtration figures varying from 102 to 168, as compared with 249 in the case of the Walton reservoirs. The "pattern" of the various curves shown as slides was also very similar, the results being specially unsatisfactory about August and September, 1915, and again in March, 1916. A large number of photographs was shown in explanation of the "falling off" in the filtration results, and it was made abundantly clear that in summer Fragillaria, and in spring Asterionella were the chief causes of the trouble.

In concluding the section (Section 11) the lecturer dealt with the question of how far laboratory filtration results could be used to pre-judge actual sand-filtration experiences. Although many factors, some but little understood, have to be taken note of in this connexion, Dr. Houston was able to show by means of slides that sometimes the number of acres of sand

cleaned at the works agreed almost exactly with the laboratory filtration results, the former curve being, of course, inverted. The inference seems to be that by the periodical examination of reservoir water the life of the sand-filters can be judged with tolerable accuracy.

ALGAL-INFECTED WATERS.

The next section (No. 12) was devoted to the treatment of algal-infected waters with copper sulphate. It was pointed out that the dose required to kill the different organisms varied within very wide limits. The maximum dose is hardly permissible, and with smaller doses there is always the chance of the way being paved for the active development of more resistant forms. Utilising this line of thought, the lecturer, for purposes of illustration, conjectured the possibility of, in a partial sense, a series of doses of copper sulphate leading to the growth of widely different organisms. To give point to his meaning, Dr. Houston showed a most beautiful series of slides in the following order: Uroglena; Asterionella, Anabœna, and Synura; Spirogyra and Oscillaria; Fragillaria and Volvox; Dinobryon; Synedra; and, finally, Ceratium. As Dr. Houston remarked, when you interfere with the balance of nature you can never be quite sure of the ultimate consequences.

Subject to the treatment being carried out by experts, the lecturer, however, was not opposed to the judicious use of copper sulphate as an algicide. Apart from sentiment, it may be a sound financial proposition to anticipate algal troubles by an inhibitory dose of copper sulphate, as this may mean prolonging the life of the filter beds very considerably. Apparently copper sulphate is a better algicidal than bactericidal agent, the converse holding true with the hypochlorites.

In Section 13 the lecturer dealt with the taste of algal-infected water. The descriptions given to these tastes and odours by scientists (e.g., geranium, mossy, cucumber, grassy, violet, nasturtium, &c.) carry small conviction to the consumer, who is apt to use more forcible expressions—e.g., like castor oil or rotten fish. Asterionella, Cyclotella, Anabœna, Oscillaria, Dinobryon, Volvox, Uroglena, and Synura, are but a few of the growths which have been credited with the production of evil tastes. A beautiful slide of Tabellaria was shown, and it was stated that the geranium-like taste produced by this growth could be successfully overcome by a small dose of postassium permanganate (5 lbs. per million gallons). Hypochlorites, in comparison, are of little use as "taste removers."

FILTRATION—WATER AND DISEASE.

Having dealt in previous sections with the River Thames from the physical, chemical, and bacteriological points of view and with the changes which occur in it consequent upon storage, the lecturer proceeded (in Section 14) to consider the effect of the last stage in the purification process (namely, filtration) on the quality of water finally delivered to consumers.

The works supplying Thames-derived filtered water are the following: Sunbury, Kempton Park, Grand Junction (Hampton and Kew), Southwark and Vauxhall, Lambeth, Chelsea, and West Middlesex. For the 10-year period 1906–16 the average bacterial "count" per cubic centimetre in the *raw* river-water was:—

Gelatine... ...	2900,	reduced to	14·8,	over 99%	reduction.
Agar	248	,, ,,	2·8	,, ,,	,,
Bile-salt agar	28	,, ,,	0·5	,, 98%	,,

As regards the B. coli test over the same period, it appears that only 21·2 per cent. of the samples of filtered water contained B. coli in 100 c.c., only 5·7 per cent. in 10 c.c., and only 0·9 per cent. in 1 c.c. The raw river water contained B. coli in 0·1 c.c. in 50·2 per cent. of the samples examined so that the conclusion is obvious that, as judged by this test, the river water is purified over 1000 times before delivery to consumers.

The actual chemical results and percentage reductions were as under:—

Ammoniacal nitrogen ...	0·0069 to 0·0003	(95·6	per cent.)
Albuminoid ,, ...	0·0155 ,, 0·0061	(60·6	,,)
Permanganate test ...	0·2099 ,, 0·0846	(59·6	,,)
Colour test	71 ,, 19	(73·2	,,)

Dealing with the quarterly results the lecturer showed that the gelatine, agar, and bile-salt agar counts were highest in the filtered water in summer and lowest in winter. This was ascribed not so much to more rapid rate of filtration during the months of maximum consumption, but rather to the effect of temperature. The B. coli test yielded the worst results in winter and the best results during the spring.

In his last section (Section 15) Dr. Houston dealt with the question of water in its relation to disease. Charts were shown proving that deterioration of the supply as judged by the more important tests "lags" a long way behind the autumnal rise in the incidence of typhoid fever.

CONCLUSION.

The lecturer concluded with the following remarks:—

"You are all aware that a Joint Select Committee of both Houses of Parliament (1910) endorsed the recommendation of the Water-supply Commission of 1869, as to the appropriation of sources, the Metropolitan Water-supply Commissions of 1893 and 1899, as to the keeping of suitable records by water undertakers, and of the Sewage Disposal Commission as to the formation of rivers or watershed boards controlled by a central administrative authority.

They recommended the establishment of such a central administrative authority as was contemplated by the Royal Commission on Sewage Disposal and the division of the country into watershed areas, and the appointment for those areas of local representative boards, who, subject to the guidance and control of the central authority, should prosecute systematic and continuous inquiries into the water-supply of their jurisdiction, take all necessary measures to husband such supplies, both surface and subsoil; secure their preservation from pollution; and advise on their allocation for sanitary, industrial, and other purposes.

Visualising the future, I foresee that a vast amount of work has yet to be done on water-supply. In these three lectures I have endeavoured to present, as faithfully as possible, one aspect of this great problem—namely, the question of rivers as sources of water-supply.

In conclusion, I still hold, as a counsel of perfection, that the purest water-supply is the supply that requires no purification. But this is not inconsistent with the view that rivers, by adequate means, can be purified to any standard of safety required."

OBSERVATIONS ON THE EFFECT OF THE ADDITION OF FRESH HUMAN BLOOD SERUM TO ARTIFICIAL MEDIA.

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IT has long been recognised that the ordinary media which are employed for the cultivation of bacteria outside the tissues are not ideal, and it is for this reason that a body fluid is often added to various media to stimulate growth. The disadvantage of this method is due to the fact that the body fluid is usually subjected to the action of heat in the preparation of the media, thus reducing some of its active properties during the process of sterilisation. In the case of many of the ordinary pyogenic bacteria, such as the streptococci and the pneumococci, there may be a comparatively feeble growth in many of the media which are employed, while experience has shown that in some of the most acute infective processes due to streptococci the original growth of the organism outside the body is often extremely limited at a time when it is most essential to obtain an active growth of the coccus. During the period when one of us (L. S. D.[1]) was engaged in studying the so-called aggressive exudates from the tissues it was noticed that in some instances an abundant growth of streptococci was obtained when an exudate was added to the ordinary media in comparatively

[1] Croonian Lectures, Royal College of Physicians of London, 1912, THE LANCET, 1912, vol. i., pp. 1593, 1671, 1737.

large amounts, while an extremely limited growth was obtained in those media inoculated without the addition of a body fluid. Further, it was proved that the addition of the unheated body fluid was the cause of the abundant growth and not the massive inoculation of the media, although some exudates had not this stimulating action on bacterial activity.

Human blood serum was obtained for the preparation of culture media from healthy adults and from others who came to the laboratories for various purposes. As far as we are aware, there is no difference in the nutritive value of the serum from a patient suffering from pernicious anæmia and that of a strong over-fed man, while the amount of serum obtained is much greater from the case of severe anæmia. Whether normal serum, however, has any special advantages for the growth of bacteria will be proved with greater experience of this method of cultivation.

Method of collecting human blood serum.—We employ special needles for the purpose, which have the advantage of a wide bore, giving a rapid flow of blood, and a sharp edge which easily passes through the toughest skin into the vein. To the distal end of the needle is attached a piece of rubber tubing some 3 or 4 inches long, and the whole is enclosed in a test-tube sterilised by dry heat. The blood is collected from a vein at the bend of the elbow which is made prominent in the usual way, and any amount from 40–100 c.c. is collected in large sterile test-tubes. The whole process takes very little time, and in our experience contamination has not occurred, although we cannot claim to employ any special method of skin sterilisation, but carefully avoid touching the active portion of the apparatus or the patient's skin except with sterile instruments.[2] After the blood is collected it is allowed to clot in the ice safe, and the serum to settle, which is merely a question of a few hours, although varying according to circumstances, to which we need not refer here. Blood collected in the morning will give a large bulk of clear serum free from red cells by the afternoon. This serum is then drawn up in quantities varying from 2–3 c.c. in glass tubing drawn out and sterilised in the flame at one and the same time, always employing a long-barrelled tube for the purpose. Human serum, owing to its weight, falls to the bottom of the tubes of fluid media, and it is here that the massive growth of bacteria is obtained. For the preparation of solid media the serum is added to the agar at the lowest possible temperature and then converted into fresh serum agar slopes or plated as required.

No experiments were made with animal serum, as we were able to obtain ample quantities of fresh human serum every morning without any trouble, and it was always sterile. In a big hospital human serum is much more readily obtained than the serum from large animals, as, quite apart from both in-patients and out-patients whose blood requires examination, students and others are generally benefited by a little blood-letting. We also used both sterile ascitic and pleuritic sera, but these appear to mix more intimately with the liquid media because of their lighter specific gravity when compared with that of blood serum, which always falls to the bottom of the tube, and there acts as the stimulating property of the medium. From the experiences which we have had with sera other than blood sera it would seem that with these there is less inhibitory action on the growth of non-pathogenic bacteria than occurs with the unheated blood serum. This in itself, if proved to be correct, is a point strongly in favour of blood serum. The addition of fresh ascitic fluid or hydrocele fluid, or even human serum, to melted agar as a medium for the growth of such bacteria as the gonococcus and meningococcus has long been the practice of certain bacteriologists, while fresh human or animal serum smeared over the surface of agar is another type of medium activated by the addition of fresh animal juices. We consider that the introduction of fresh human serum to the carbohydrate media produces the most satisfactory medium for the growth of such bacteria as streptococci, pneumococci, meningococci, and gonococci—that is, those bacteria which require something more than is usually supplied outside the tissues. Such organisms as the meningococcus are able to live in carbohydrate media for relatively long periods if human blood serum has been added, as is described elsewhere in this communication. Further, the morphological and cultural characteristics of such an easily cultivated organism as the diphtheria bacillus are considerably altered by growing it in various carbohydrate media containing fresh human serum.

[2] We consider this method of obtaining blood to be the most painless, the quickest, and the most efficient which we have employed during many years' experience in human pathology.

A. *The Effect of the Addition of Fresh Human Blood Serum to Artificial Media upon the Growth of Bacteria.*

The most notable effect of the addition of fresh serum is that upon the amount of growth produced. Whether the serum is added to liquid carbohydrate media or whether it is incorporated with agar according to the method described above, the amount of growth in actual visible bulk is considerably greater than can be obtained with any other medium available. This effect is particularly striking in the case of those organisms which by the ordinary cultural methods grow but feebly, such as some strains of streptococci and pneumococci, the meningococcus and the gonococcus. It may be mentioned at this point that where it is subsequently stated that "no growth" has occurred in any liquid medium we mean no obvious growth to the naked eye, whether as a deposit at the bottom of the tube, adherent to the sides, or suspended in the medium. Films were only made in those cases where it was of considerable importance to discover a trace of growth.

Streptococci.—The favourable influence of fresh serum is best shown when a streptococcus is grown in the sugar media, particularly in the case of dextrose. The deposit in the tube to which serum has been added is frequently enormous and composed of large flocculent masses, while that in the control tube is much finer in consistence and far less in actual bulk. Advantage may be taken of this mass of growth in the preparation of a vaccine. If the deposit is washed in saline and emulsified it will form a perfectly homogeneous emulsion free from clumps and in density equal to an emulsion prepared from a 24-hour agar culture of bacillus coli, using the same volume of saline in each case.

Pneumococci.—The effect is no less striking in the case of the pneumococcus. Although the amount produced in the sugar media in 24 hours may not be so great as is the case with some strains of streptococci, yet it is always far greater than in those tubes to which serum has not been added. If a subculture on to nasgar produces only a scanty growth or fails entirely, a fine growth of large colonies may be obtained if the fresh-serum agar is employed.

Meningococci.—All the strains tested were isolated directly from the cerebro-spinal fluid of cases of cerebro-spinal fever. The most favourable media for this organism were found to be dextrose with fresh serum and the fresh-serum agar. In the former an enormous deposit is obtained in 48–72 hours, and in the latter a fine crop of large colonies. When subcultures on nasgar fail the fresh-serum agar will frequently show abundant growth.

Gonococci.—Three strains of this organism were examined.

1. Cultures from the urethra were made directly on to three red-cell agars, one tube of nasgar, and one of fresh-serum dextrose. At the end of four days' incubation all were sterile except the fresh-serum dextrose, which showed an abundant growth of the gonococcus. Subcultures were then taken from the latter on to red-cell agar and fresh-serum agar. No growth took place on the red-cell agar, but was abundant on the fresh-serum agar.

2. In this case the urine was full of pus, and a portion of the deposit was put directly upon red-cell agar, fresh-serum agar, and fresh-serum dextrose. The red-cell agar proved sterile, whereas growth was abundant in the other two media.

3. A swab from the urethra was inoculated into fresh-serum dextrose. A good growth was obtained at the end of 48 hours, in which an organism resembling the gonococcus was predominant. The deposit was plated on a fresh-serum agar plate and numerous colonies of the gonococcus were obtained.

Diphtheria.

The growth and morphology of the diphtheria bacillus in fresh-serum media are best considered under one heading.

If we refer to the standard work on the diphtheria bacillus by Nuttall and Graham-Smith[3] we find certain remarks on the morphological features of this organism to

[3] The Bacteriology of Diphtheria. Nuttall and Graham-Smith. Cambridge University Press, 1908.

which we must refer. It might be as well to mention at the outset that the diphtheria bacillus grows abundantly in many of the carbohydrate media containing fresh human blood serum, but more especially in the presence of dextrose. It is also our experience that if the bacillus grows on inspissated blood serum it will also grow, and grow well, in the serum media to which we have referred. The morphological characters may be absolutely distinct if grown in various carbohydrate media to which the serum has been added, and, further, the morphology will be quite distinct in litmus dextrose containing fresh human serum compared with that on inspissated blood serum, although the bacillus may be growing equally well in each case. Further, a diphtheria bacillus which has certain typical characteristics when grown on blood serum will give equally distinctive characteristics in one of the sugar media containing blood serum, while the original morphological appearances can be restored in the next subculture back on to blood serum or *vice versa*. Such alterations are produced by growing the organism for 24 hours at 37° C. and then making the transfer and again incubating for another 24 hours and repeating as required for the purpose.

The abundance of growth in the fresh serum media as compared with that in the simple carbohydrate media and the greater metabolic activity of the organism are very definitely emphasised, but of course these points have been to some extent recorded previously by Graham-Smith and others in their experiments with Hiss's serum-water media to which the carbohydrates had been added, although this is a medium which is subjected to heat for the purpose of sterilisation. Williams [4] in 1902 found out the value of a medium known as ascitic broth, which consisted of broth to which 25 per cent. ascitic fluid had been added. In this medium he found that the diphtheria bacillus grew abundantly and produced a high degree of toxicity. Other workers who are quoted by Nuttall and Graham-Smith employed a medium of human serum broth containing 10 per cent. of the serum.

1. *Growth and acid production in the sugar media.*—Of 12 strains examined 4 were put through the following media with and without fresh serum: Dextrose or maltose, lactose, cane-sugar, mannite. Of the plain media without serum, dextrose or maltose was readily acidified, lactose slightly after 48 hours on three occasions, cane-sugar once slightly after 72 hours, but mannite never. The corresponding media to which blood serum was added were all acidified in periods varying from 24–72 hours, mannite being the least affected, while the growth in every case was much more extensive than in the plain carbohydrate media.[5]

2. *Growth on fresh-serum agar.*—This was found to be a particularly favourable and convenient medium for the cultivation of the diphtheria bacillus, especially for plating out a mixed culture. In this respect it is far superior to ordinary nasgar. The throat swab from one case was plated direct on two plates, one of nasgar and another of fresh-serum agar. Only staphylococci grew on the former, while on the latter together with the cocci were masses of diphtheria colonies showing organisms of the beaded type. Another case gave an abundant growth of the diphtheria bacillus on each plate, but on the fresh-serum agar the growth was purer and the individual bacilli were larger and showed a more typical arrangement. The characters of the colonies growing on this medium are distinct, being large, grey, and moist, and tending to be confluent.

3. *The influence exercised by fresh serum upon the growth of the diphtheria bacillus as opposed to other organisms present in the throat swab.*—Six swabs were taken from cases of clinical diphtheria and put direct into fresh-serum maltose and on to inspissated blood serum. Where diphtheria bacilli were present in the liquid medium they were also present on the solid, and the proportions in each case were about equal. The fresh-serum maltose favoured the growth of streptococci and diplococci, while the proportion of staphylococci was greater on the solid blood serum.

4. *The effect of liquid fresh-serum media upon the morphology of the diphtheria bacillus.*—This effect was most remarkable, and is best illustrated by quoting examples from each case examined.

Case 1.—In fresh-serum dextrose were found bacilli of the striped form. In fresh-serum lactose they were chiefly of the short form and many of the Hoffmann type, while in fresh-serum mannite they were of the typical long type with clubs.

Case 3.—On blood serum were the long and clubbed formations, while in the fresh-serum dextrose the bacilli were long and swollen in the middle, and similar shapes only were seen in the fresh-serum mannite.

Case 6.—On blood serum the bacilli were long and beaded, and many typical club shapes were present, while on fresh-serum agar they were of the thin type with very few clubs. In fresh-serum dextrose the bacilli formed characteristic clumps, while the individual organisms were short, oval in shape, with pointed ends. A few long forms were seen, but these were rare. In fresh-serum cane-sugar there were typical clumps of beaded bacilli of a very thin type. No oval forms were seen, nor did any of the bacilli present resemble those seen in the fresh-serum dextrose.

We have, then, from the use of these culture media four different aspects of the morphology of this organism all grown from the same strain: the club shape, the long beaded, the very fine thin type, and that resembling Hoffmann's bacillus.

Summary.—The value of fresh serum in the cultivation of the diphtheria bacillus would appear to be (1) its addition to ordinary agar for plating purposes; (2) its use in the production of a liquid medium most favourable to the growth of the organism; and (3) in affording a means of studying its very variable morphology. The precise significance of Hoffmann's bacillus is at present undetermined; at any rate, it cannot be said with absolute certainty that morphologically it is an organism quite distinct from the diphtheria bacillus. It has been shown that the presence of fresh serum will cause certain sugars to be acidified by the growth of the diphtheria bacillus, upon which it would otherwise have no action, and that its morphology is profoundly altered under certain conditions.

Staphylococci.—A similar influence is exercised by fresh serum upon the amount of growth produced in the sugar media by the staphylococcus aureus, although not to such a notable extent, this organism growing readily enough without serum. The albus variety has not so far been specially investigated.

B. *The Presence of Fresh Serum Encourages Growth where Culture on Other Media Fails.*

We have considered the amount of growth produced in media to which serum has been added, and it may now be of interest to consider instances where the presence of fresh serum encourages growth where culture on other media fails. We have already seen instances of this point in the case of gonococci and meningococci, and there are many other examples in the case of the pneumococci and streptococci.

Pneumococci.—(i.) Growth was obtained in lactose, but not in raffinose, salicin, or inulin. The addition of fresh serum, however, produced abundant growth in these media, all being inoculated from the same source and at the same time.

(ii.) A pneumococcus was obtained from a blood culture and was growing fairly well on nasgar. Subcultures were made from this into dextrose, raffinose, salicin, mannite, and inulin, with and without fresh serum. With the exception of inulin, no obvious growth took place even after three days in the plain media, but was abundant in 24 hours in all those to which fresh serum had been added. There was a slight growth in the inulin although the medium was unaltered, while the fresh-serum inulin was acidified and clotted. After passage through a mouse it acidified and grew in plain dextrose and raffinose, but still did not clot the heated serum inulin. We shall return later to the effect of fresh serum upon the metabolic characters of both pneumococci and streptococci.

Streptococci.—(i.) A streptococcus isolated from a wound was subcultured into dextrose, salicin, and inulin with and without fresh serum. Growth occurred in all the serum tubes in 24 hours, but in the plain media there was none at the end of 48 hours.

(ii.) A streptococcus was isolated from a case of ulcerative endocarditis. It grew slightly without acid formation in plain dextrose after 48 hours, but not in raffinose, salicin,

[4] A. Williams, quoted by Nuttall and Graham-Smith, 1908, p. 175.

[5] The considerable acidity produced by the growth of the bacillus in dextrose with human blood serum may considerably affect the pathogenicity of the organism.

or mannite. In similar media with fresh serum there was abundant growth with acid production in 24 hours.

(iii.) A streptococcus could not be induced to grow in subculture upon nasgar, although a fair growth could be obtained on a similar medium to which red cells had been added. It was inoculated into fresh-serum dextrose and an abundant growth was obtained in 24 hours, and subcultures were made from this into dextrose, salicin, mannite, and cane-sugar with and without fresh serum. There was growth in the plain cane-sugar in 48 hours, but in none of the others without serum. In all the serum tubes there was ample growth in 24–48 hours.

Numerous other examples were met with, where growth would only occur in the dextrose or maltose without serum, but where there would be growth in all the media inoculated to which serum had been added.

Not only does the presence of fresh serum increase the amount of growth of the streptococci and pneumococci in pure culture, but there is a distinct tendency for it to encourage the growth of these organisms in subcultures from pus and sputum where staphylococci are also present. If a swab infected with staphylococci and streptococci be inoculated into two tubes, one containing dextrose and the other fresh-serum dextrose, the latter will show a very large growth of streptococci with few staphylococci, while the plain dextrose may contain staphylococci only, or the two organisms in about equal numbers, depending no doubt upon the character of the streptococcus in question. It is, however, a rapid and easy method of getting a considerable growth of a streptococcus where there is a mixed infection.

Further, if we are dealing with a sputum from a case of suspected pneumococcal infection it is a useful plan to put it straight into fresh-serum dextrose. If pneumococci are present in the sputum this medium will grow them in large numbers, and perfect examples of capsule formation may be capable of demonstration. A streptococcus of the salivarius type is nearly always present in association, but can be separated by subsequent plating if desired.

C. *The Presence of Fresh Serum Stimulates the Growth of Pathogenic Organisms as Opposed to Non-pathogenic During the First 24–48 Hours at 37° C.*

The following is an example of the value of the fresh-serum media in this respect. A sputum in which pneumococci were present in very large numbers was inoculated into inulin and raffinose with and without fresh serum. Both the serum media showed practically a pure culture of pneumococcus, whereas the plain tubes grew other organisms as well. Plates made from the raffinose showed a limited growth of the pneumococcus and numerous other colonies, whereas those made from the raffinose serum tube gave a pure culture of the causal organism.

Further experience has led us to adopt a similar plan for the isolation of the causal organism when taking a swab from the throat, nasopharynx, tooth-socket, or other infected focus likely to be contaminated with air organisms, and led us to use the method in cases of suspected diphtheria. The following is an interesting example of the inhibitory influence exercised by fresh serum. Dextrose and fresh-serum dextrose were inoculated from a tube of heated blood serum upon which suspected diphtheria bacilli were growing from a throat swab. In 24 hours the dextrose tube showed a few diphtheria bacilli, but very large numbers of yeast organisms, while in the serum tubes no yeast could be seen, but typical diphtheria bacilli were abundant. This culture was plated on fresh-serum agar and subcultures on to inspissated blood serum, and in each case a pure growth of B. diphtheriæ was obtained. In another 24 hours, however, large numbers of yeast organisms whose growth had hitherto been inhibited by the presence of the fresh serum were present in the tubes of fresh-serum dextrose.

D. *The Length of Life at 37° C. of Organisms Growing in Carbohydrate Media to which Fresh Serum has been Added.*

The organisms specially tested in this respect were four strains of the meningococcus, all isolated from the cerebro-spinal fluid of cases of cerebro-spinal fever, one of micrococcus catarrhalis, and two of the gonococcus. Fresh-serum dextrose was the medium employed, and subcultures were made from the deposit of the original tube at weekly intervals. No fresh supply of serum was added afterwards.

Meningococcus.—1. Lived for eight weeks in one tube of this medium. Subculture on to nasgar failed after four weeks, but good growth was obtained on fresh-serum agar for the remainder of the period.

2. Lived for six weeks. Subcultures on to nasgar were successful to the end, no further growth being observed on fresh-serum agar.

3. Lived for three weeks. Subcultures grew on nasgar; no further growth on the fresh medium.

4. Was kept in the following media, to which serum had been added—maltose, lactose, raffinose, and mannite. Maltose was acidified, but the others were alkaline. Subcultures to nasgar succeeded only for three weeks. At the end of four weeks subculture from the serum maltose failed on fresh serum agar, but the other cultures gave abundant growth on this medium after five weeks, especially the serum mannite, which was still alkaline. These cultures are still under observation. Possibly the absence of acidity favours the life of this organism.[6]

M. catarrhalis.—This organism lived seven weeks, and subcultures were obtained to the end on nasgar.

Gonococcus.—1. Was alive after 12 days, but dead in 17 days. Abundant growth was observed on fresh-serum agar, while those on red-cell agar were sterile. 2. Lived for one week.[7]

E. *The Effect on Morphology.*

In the case of the streptococci the invariable effect of the presence of fresh serum in the carbohydrate media is to encourage longer chain formation, and the individual cocci are larger and stain better. On the other hand, with the pneumococci the diplococcal arrangement is favoured as against the streptococcal, and well-marked capsule formation may occur. A strain obtained from an empyema grew in all the plain sugar media as a typical streptococcus, but as a diplococcus in all those to which fresh serum had been added. It would seem, therefore, that fresh serum by providing an environment suitable to vigorous growth of an organism causes it to display its proper morphological characters. Its influence upon the morphology of the diphtheria bacillus has already been described.

F. *The Effect of the Addition of Fresh Human Serum to Artificial Carbohydrate Media upon the Action of Organisms on these Media.*

The only action of bacteria upon artificial carbohydrate media which has been studied is the acid production. It may be stated at the outset that the addition of fresh serum has no effect one way or the other upon gas production as far as we can estimate from the experience at hand. Speaking generally, this addition to the media will not only stimulate the growth of organisms, as has already been shown, but will cause them to acidify those media upon which otherwise they would have no effect. These two actions usually run *pari passu*, but by no means always. By the use of litmus media throughout it is possible to see very clearly and with reasonable accuracy the amount of acid that has been produced in a given time.

It is possible to have abundant growth without any visible acid production; this occurs chiefly in the case of certain strains of streptococcus growing in fresh-serum mannite. We can also have all degrees of acid production in the various media. Faint acidity is illustrated by a red tinge at the bottom of the tube; when stronger the whole of the medium is red; and when the acidity is still more marked the medium will gradually become decolourised. Decolourisation of the medium may also occur without any visible acid production. This happens sometimes in serum mannite with some strains of streptococci and pneumococci. It also occurred with the Shiga bacillus, which decolourised serum raffinose, cane-sugar, and dulcite.

The streptococci.—Thirty-four strains were studied, no attempt having been made to group the cases in any way, but simply to make a statement of the reactions obtained. The sugar media employed were dextrose, raffinose, salicin, mannite, inulin, and sometimes maltose in the place of dextrose if no tubes of the latter happened to be available at the moment. Milk was only used occasionally because it was not considered a suitable medium with which to

[6] At six weeks the serum mannite became contaminated, but the organism remained alive for one week longer in fresh-serum lactose, making seven weeks of life altogether. Two more strains have since been tested for length of life; one lived five weeks and the other six weeks in fresh-serum dextrose.

[7] Two other strains have since been examined; one lived 19 days in fresh-serum dextrose and the other 10 days on fresh-serum agar.

compare the effect of the addition of fresh serum. The inulin employed was Hiss's heated serum inulin.

The addition of fresh human serum to these media before inoculation had the effect of very considerably increasing the capacity of the streptococcus under examination to ferment them. There were many examples where none of the plain media were acted upon by the organism, but where all

Table showing the Effect of Fresh Serum upon the Fermentation Tests.

Medium.	Streptococci, 34 strains.		Pneumococci, 13 varieties.	
	Acidified per cent.	No. of times medium used.	Acidified per cent.	No. of times medium used.
Dextrose	77	27	81	11
,, + Normal serum ...	100		100	
Raffinose	37	27	83	12
,, + Normal serum ...	85		100	
Salicin	23	34	23	13
,, + Normal serum ...	97		92	
Mannite	0	30	14	7
,, + Normal serum ...	36		57*	
Inulin	18	16	10	10
,, + Normal serum ...	31		100	

* Decolourised.

similar media with fresh serum were acidified. A complete record of such results necessitated the keeping of extensive tables, for we have recorded growth as well as acidification and the number of hours in which they have appeared. Since no attempt has been made at classification we have thought it best to summarise the results in the accompanying table, the point being to demonstrate the effect of fresh serum upon the fermentation reactions.

Dextrose would appear to be the most favourable medium in this series (see table). Maltose was used 12 times and was acidified in every case, but with one exception a similar result was obtained with dextrose, so it is not included in the table. Salicin, an important medium to those who place reliance on the fermentation tests, was only acidified 8 times out of 34 strains examined, while in every case save one (that of a urinary streptococcus) there was acid production when fresh serum was added. None of the strains tested, including those isolated from wounds and two from fæces, acidified mannite alone, but the fresh-serum mannite was acidified 11 times out of 30 and decolourised once. The favourable influence of the fresh serum was least marked in the case of inulin. In two cases, however, its addition caused abundant growth with clot formation where no change occurred in the control tubes without fresh serum.

The fermentation results may also be shown graphically in the accompanying curves.

Pneumococci.—Thirteen varieties of this organism were tested, and the results are expressed in a similar manner. (See table.) The numbers tested are insufficient to enable one strictly to compare the results obtained with those among the streptococci. So far as they go they agree in the case of dextrose, and also very closely in the case of salicin both with and without fresh serum, the effect of the addition of fresh serum being strongly marked with the latter medium. There is a fair difference with raffinose, but the fresh-serum inulin was acidified in every case, thereby not only differing from the results obtained with the streptococci in this medium, but also demonstrating in a very clear manner its value as a suitable medium for the pneumococcus, since Hiss's heated serum inulin was only fermented once, and then only when it was inoculated with a definite volume of pus. One strain grew in all the sugars without serum as a streptococcus, but in all those with fresh serum as a typical pneumococcus. In one instance all media were inoculated with a definite volume of pus; here the results obtained from the media with and without serum more closely corresponded than in any other instance owing to the presence of serum in the pus.

Staphylococci.—The fresh serum makes very little difference to the fermentation reactions of the staphylococcus aureus, the ordinary sugars being acidified with great readiness, but when grown in fresh-serum salicin there is frequently an inhibition of acidity compared with the plain salicin, although the growth may be considerable and autolysis marked.

The Effect of Culture in Fresh Serum upon the Variability of Streptococci and Pneumococci towards the Fermentation Tests.

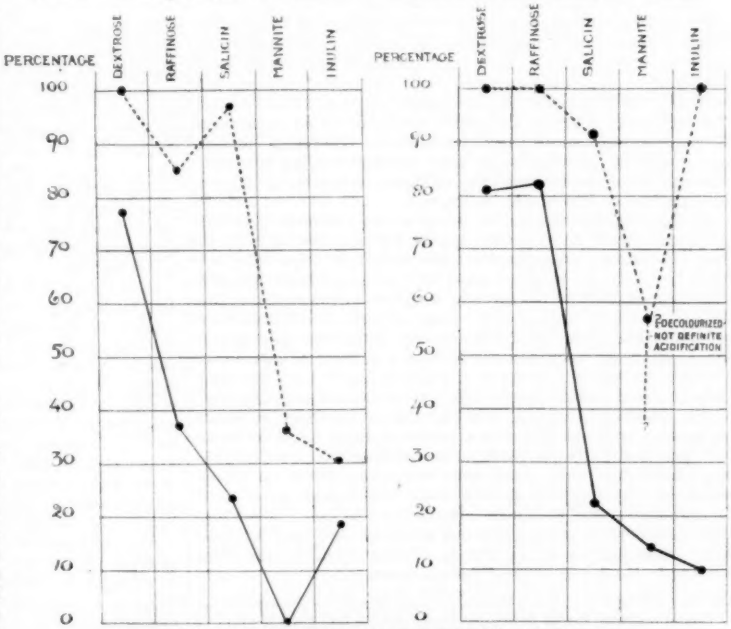
Ainley Walker[3] showed that the continual culture of streptococci in various media for periods up to two years had the effect of altering their behaviour to some of the fermentation reactions, and he obtains a similar result after successive passages through a mouse. He concludes as a result of his observations that the fermentation reactions are largely dependent upon the environment in which the organisms have been growing.

Our results tend to confirm these conclusions, since growth in a fresh-serum medium in so short a period as 24 hours completely altered the fermentation reactions in those cases where this point was tested. We have only recognised this fact recently, so that the evidence is not extensive although so very definite and unmistakable that one is led to the conclusion that further experiments in this direction can only confirm our present results.

Streptococci.—1. A subculture from nasgar neither grew in nor acidified salicin in 48 hours. The same organism after subculture in fresh undiluted human serum grew freely in this medium with abundant acid production in 24 hours. The other reactions remained the same.

2. This was isolated from a case of ulcerative endocarditis.

CURVE 1.—*Streptococci, 34 strains.* CURVE 2.—*Pneumococci, 13 strains.*



Fermentation of carbohydrate media with and without fresh serum.
Dotted lines represent fresh-serum media; straight lines represent plain media.

In this and in subsequent subcultures abundant growth occurred in all the fresh-serum carbohydrate media, and acid was produced in all but fresh-serum mannite. On the other hand, there was considerable variation in the fermentation of the plain carbohydrate media in three subcultures. First

[3] Proc. Roy. Soc., B, vol. lxxxv., 1912.

subculture from *nasgar:* Salicin acidified, dextrose, raffinose and mannite unaffected. Two of the fresh-serum media were chosen from which to make subcultures. The fresh-serum salicin showed vigorous chain formation and the individual cocci stained perfectly, while the growth in the fresh-serum mannite, though abundant, showed considerable autolysis. Second subcultures from *fresh-serum salicin:* Raffinose and salicin acidified, dextrose and mannite showed no change. Third subculture from *fresh-serum mannite:* Dextrose acidified, salicin, raffinose and mannite unchanged.

Pneumococci.—1. Isolated from an empyema. The pneumococcus while growing freely in the fresh-serum media did not acidify salicin, but a subculture from fresh-serum salicin readily acidified the plain medium.

2. An example of variability after animal passage. Isolated from a blood culture, it had no effect on dextrose, raffinose, salicin, mannite or inulin, but in the fresh-serum media it was growing strongly and the fresh-serum inulin was clotted. This culture was passed through a mouse, and the pneumococcus isolated from the heart blood acidified dextrose and raffinose, but still had no effect on salicin and no more effect on the heated serum inulin than on the first occasion.

It is reasonable to suppose, therefore, that cultures in fresh-serum media will be proved to have an effect upon the variability both of streptococci and pneumococci equal to, if not more than, that effected by animal passage, and it would be an interesting point to compare the two with the same organism.

The general inference is that the addition of fresh serum to carbohydrate media, although in itself possessing a potential alkalinity, so favours the growth of streptococci and pneumococci as to enable them to acidify those carbohydrates in which they appear to produce little effect in the absence of serum. It would seem that this influence cannot be merely due to the physical properties of the serum preventing the diffusion of the inhibitory carbohydrate medium among the growing organisms, nor can it be ascribed to the protein content or the reaction of the serum, because such influence is not similarly exerted by heated serum, as shown by Hiss's heated serum inulin.

It might be suggested that the presence of dextrose in normal fresh serum might account for the acid production, but in the first place it is in very small amount (0·1 per cent.) and the acid production is out of all proportion to the quantity present, and again, fermentation does not always occur in the fresh-serum media as it should if the dextrose in the serum were responsible for the effect. We must assume, therefore, that there is some fresh principle akin to the vitamines which is necessary to vigorous growth in the case of these organisms, and that there is some connexion between vigorous growth and the capacity to ferment certain carbohydrates, although there is nothing at present to prove that such connexion is absolute or direct.

It is not our intention to make any attempt to enter into the controversy as to the value or reliability of Gordon's fermentation tests in affording a means of classification of the streptococci, but rather to suggest that the employment of fresh-serum media may assist in solving the problem of their variability. If it is to be assumed, according to Gordon,[9] with the modifications suggested by Andrewes and Horder,[10] that there are certain fixed types or predominant groups of streptococci connected by a number of variants, then the culture with fresh serum may do away with the large number of such variants which have hitherto obscured any sharp distinctions between the types, variants which may possibly be due to the vigour of the growth under examination. If, on the other hand, the hypothesis stated by Ainley Walker,[11] on the evidence of his own experiments and those of others, is correct—namely, that there is only one streptococcus pathogenic to man, and that the difference in the power of certain strains to ferment any given carbohydrate is due to their adaptation to a particular previous environment—then the presence of fresh serum may also eliminate finer cultural distinctions by providing an environment which, as our experiments show, is the most favourable hitherto obtained under artificial conditions.

[9] Gordon: THE LANCET, 1905, vol. ii., p. 1400.
[10] Andrewes and Horder: THE LANCET, 1906, vol. ii., pp. 708, 775, 852.
[11] Ainley Walker: Loc. cit.

Summary.

The addition of normal fresh human blood serum to artificial media in the culture of micro-organisms has the following effects:—

1. It provides a most favourable medium for growth where culture under artificial conditions may otherwise fail.
2. It greatly increases the amount of growth in those media to which it has been added compared to those prepared without it.
3. It stimulates the growth of pathogenic organisms as opposed to non-pathogenic.
4. It prolongs the life of organisms which are prone to die out under artificial conditions as shown in the case of the meningococcus.
5. It greatly facilitates the culture of the diphtheria bacillus, and in its combination with different media helps to illustrate all aspects of the morphology of this organism.
6. It exercises considerable influence upon other organisms of variable morphology tending in the case of the pneumococci to reproduce the true type as found in the body fluids.
7. It profoundly alters the fermentation reactions of the streptococci and pneumococci, tending to obliterate the finer differences between types or the differences due to particular environment.

THREE CASES OF ENTAMŒBA HISTOLYTICA INFECTION TREATED WITH EMETINE BISMUTH IODIDE.

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(*Report to the Medical Research Committee.*)

IN THE LANCET of July 29th last, Dr. H. H. Dale has called attention to the fact that emetine hydrochloride given subcutaneously fails to effect a complete cure in a number of cases of intestinal amœbiasis. He emphasises the fact that after treatment some patients cease, for a time, to pass cysts and then relapse and become chronic carriers of Entamœba histolytica; while in others prolonged treatment with the usual 1-grain dose given daily for 12 days in succession fails entirely to arrest the passage of cysts. American workers and others have also noted this, and lately Mr. Geoffrey Paget and Mr. Redman King have specially drawn attention to it in soldiers treated in the Graylingwell Military Hospital at Chichester. In some of these, however, apparently successful results have been obtained by the subsequent employment of a new emetine compound, emetine bismuth iodide. Dr. Dale narrates some of these successes in his paper, and owing to his kindness we have been able to employ the new compound in the treatment of a series of patients suffering from entamœbiasis. Three of these are of special interest, as they represent different types of entamœbic infection, and two of them had never been previously treated with emetine. The details of these three individuals are as follows.

CASE 1.—*Acute amœbic dysentery.*

History.—The patient, a native, was born in Bombay and had spent most of his life at sea. As regards previous illnesses, he stated that he had always been healthy, never having had anything important the matter with himself before. Was quite well when the ship on which he was working left Bombay. Shortly after this, however, he developed a severe pain in the abdomen, with looseness of the bowels. This was followed by severe purging, 12 to 15 stools a day, and then by the passage of blood and mucus. The condition gradually became worse, so when the ship arrived in London he was sent into the Seamen's Hospital at the London School of Tropical Medicine. On the voyage only palliative treatment was adopted, no emetine having been administered.

Examination.—Clinically the case was typical of acute entamœbic dysentery, the stools consisting of nothing but shreds of mucous membrane, with blood and small sloughs. Microscopic examination revealed the presence of many typical active amœbæ, Entamœba histolytica. Pressure over

the colon elicited great pain and tenderness, this being most marked over the region of the sigmoid. There was no rise of temperature; the patient was thin, but not emaciated; his other systems were normal.

Treatment.—This was begun at once on July 6th, 3 grains of emetine bismuth iodide being administered that evening. This caused no discomfort or sickness. A similar dose was given next night, and so on until 12 had been taken consecutively. The amœbæ disappeared rapidly, none being found after the third dose, and all blood and mucus had disappeared after the fourth. Towards the end of the treatment a distinct diarrhœa appeared, but this was disregarded. It improved a few days after the last dose, and up to the time of writing this paper the patient has convalesced in the usual manner. Table I. shows the results of the treatment at a glance.

TABLE I.

	July, 1916.																										
Date	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	24	27	31
Treatment	E	E	E	E	E	E	E	E	E	E	E	E							
E. hist.	+++	++	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

R = Emetine bismuth iodide, grs. iii. +++ = Very heavy infection. ++ = Medium infection. + = Scanty. – = Negative. E. hist. = Entamœba histolytica, amœboid stage.

CASE 2. *Convalescent carrier of long standing.*

History.—The patient, an Englishman, went to India in 1898, and left there in 1909. His heath on the whole was good. He suffered from malaria at times, had enteric in 1906, had dysentery in 1908, and becoming neurasthenic after that was sent home the following year and did not return. From that time till 1914 he kept more or less fit, but he several times had looseness of the bowels and some distinct abdominal discomfort. On Dec. 25th, 1914, he got a chill, and with this a return of pain and tenderness in the abdomen and slight irregularity of the bowels. An examination of the stools at the London School of Tropical Medicine was made and encysted amœbæ, E. histolytica, were found. A course of emetine was prescribed, one injection every day for a fortnight (dose probably ⅓ or ½ a grain), and the cysts then were said to have disappeared. During the summer of 1915 he was not well, and towards the autumn had pain again and signs of dysentery, three or four stools a day with a considerable amount of mucus. He was not on a strict diet, and was taking alcohol.

Examination.—He was first seen by one of us on Dec. 20th, 1915, and then presented nothing specially abnormal, no pain or tenderness over the colon, and no cysts in the stools. He was put on a strict diet and all alcohol was stopped. Further examinations of the stools during January and February, 1916, showed no abnormalities; but in July, as he was not feeling well, a further search demonstrated the presence of E. histolytica cysts again. At this time he complained chiefly of what he described as gnawing pains in the abdomen; but there was no diarrhœa, the stools as a rule being one a day only. They were of a somewhat soft consistence, of an ordinary colour, and did not look in any way abnormal.

Treatment.—This was begun on July 19th, 3 grains of the emetine bismuth iodide being administered on that evening and subsequently until 12 consecutive doses had been administered. In this instance the drug was not very well borne, as a rule the patient vomiting every night after the administration. This was not violent, however, and he was able to take his breakfast next morning as usual. Cysts disappeared after the fourth dose. A certain degree of diarrhœa was present after the seventh dose, but not of sufficient amount to interfere seriously with the treatment. Table II. shows the results of the treatment.

TABLE II.

	1915.			July, 1916.															
	Dec.	Jan.	Feb.																
Date...	20	13	23	4	11	14	19	20	21	22	23	24	25	26	27	28	29	30	31
Treatment							E	E	E	E	E	E	E	E	E	E	E	E	E
E. hist.	–	–	–	–	++	+	–	–	–	–	–	–	–	–	–	–	–		–
E. hist. cysts.	–	–	–	+	–	+++	+++	+++	++	+	–	–	–	–	–	–	–		–

E = Emetine bismuth iodide, grs. iii. +++ = Heavy infection. ++ = Medium infection. – = Negative. E. hist. = Entamœba histolytica, amœboid stage. E. hist. cysts = Entamœba histolytica cysts.

CASE 3.—*Contact carrier case.*

History.—The patient was an Englishman who had never been out of Europe. This is a specially interesting case, as the subject only discovered accidentally that he was passing E. histolytica cysts, and never at any time had had any signs of dysentery, diarrhœa, or other irregularity of the bowels. He came to learn the routine methods of examination of human fæces for protozoa with one of us (C. D.), and upon examining his own fæces about three months later discovered what he believed to be cysts of E. histolytica. He therefore brought these to one of us (C. D.), who verified the diagnosis. It is not certain where he acquired his infection, but everything points to his having picked it up in the laboratory whilst engaged in examining stools containing cysts of E. histolytica. This is the more likely as it is now five years since he was out of England. Previously to this he had visited Italy (northern), the Riviera, Switzerland, and the south-west of France—places where amœbic dysentery, as far as we are aware, is not endemic.

Examination.—Apart from a suspicion of tenderness over the transverse colon, there was nothing of interest to note. There was no raised temperature, no pain over the liver, and the stools were normal. Cysts could not always be found in the fæces.

Treatment.—Treatment was begun on the evening of June 14th, emetine bismuth iodide, grains iii., being given. Though causing no actual vomiting, the drug disagreed with him, causing nausea and diarrhœa. Subsequent doses on the 15th, 16th, 17th, and 18th increased these symptoms to such an extent that the treatment had then to be abandoned. The cysts disappeared from the stools after the fourth dose and have not been found since. Table III. shows the results of the treatment and stool examinations.

TABLE III.

	June, 1916.													July.											
Date...	9	14	15	16	17	18	19	20	22	23	24	26	28	30	3	5	7	8	10	13	15	18	21	24	28
Treatment		E	E	E	E	E																			
E.hist cysts	+	++	+	+	+	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

E = Emetine bismuth iodide, grs. iii. + = Positive result, small infection. ++ = Moderate infection. – = Negative result.

It may be noted here that the three cases just described all appear to be cases of infection with Entamœba histolytica alone. No other protozoa have been found in any of them.

If one studies the histories of these three cases it will be seen that this new emetine compound given by the mouth has been equally efficient to emetine by the needle, or to the old ipecacuanha treatment, in the case of acute dysentery reported (Case 1). The amœbæ disappeared rapidly, as did also the blood and mucus, together with the pain and other symptoms. Whether or not a complete sterilisation has been effected can only be determined by prolonged examinations conducted over a long period of time; but, unfortunately, this will not be possible in this case, as the man eventually will have to return to his ship and go abroad again.

Case 2 is just the type of case that one expects to do badly when treated by the ordinary 1-grain doses of emetine subcutaneously. It is now over seven years since the patient acquired his infection, and during that time treatment with comparatively small doses of emetine had been employed, a procedure which apparently tends to produce a resistant strain of amœbæ with the subsequent passage of cysts. The emetine bismuth iodide quickly got rid of his cysts, and though it is too early to say yet whether this disappearance is permanent, from what one learns in other cases the result is distinctly hopeful. Of course, one cannot say that, in this instance, emetine subcutaneously in the ordinary way would not have produced the same effect. That it can do so in some instances is undoubted, as two cases published by one of us in the *Journal of Tropical Medicine and Hygiene* (Feb. 1st, 1916) have now been free from cysts, the one for one year and two months, the other for over six months, after one course of treatment with 1-grain doses of emetine hydrochloride subcutaneously on 12 successive days.

Others have studied cases for shorter periods of time than these with similar results; but there are nevertheless many other cases known—some of them to us personally—where emetine injected subcutaneously has failed to make any

difference to the passage of cysts at all. It is for these cases that a new form of treatment is required.

Case 3 probably had little ulceration and had only a small infection; but even granting this, only five 3-grain doses of the new compound seem to have completely sterilised him, no cysts having been found now for six weeks. It is, of course, possible that emetine administered hypodermically in this case also might have produced an equally satisfactory result. Nevertheless, we may note that two other similar contact carriers who came under the observation of one of us failed to get rid of their infections after repeated 1-grain injections of emetine hydrochloride hypodermically. (One of these had 13, the other 14 grains of emetine altogether.)

It is possible that in carriers the amœbæ are living in pockets in the bowel, as Dr. Dale suggests, and that the emetine when injected never reaches them. This is certainly borne out by the fact that the exhibition of the drug by the mouth—either the whole drug, ipecacuanha, as advised by American workers, or the new compound, emetine bismuth iodide—seems to clear cases quickly which have resisted all attempts by the needle.

One point brought out by the cases we have treated so far is that this new emetine compound produces much more disagreeable symptoms than emetine hydrochloride given by the needle. Some of these recall to one's memory the old ipecacuanha days, though the symptoms after administration of the double iodide are in many cases far less severe. Sickness is fairly common, many of the patients feeling distinctly unwell during and immediately after their treatment, while others are purged. But it must be remembered that the latter is not uncommon even when the needle is employed.

So far the drug has been given in a single dose of 3 grains—this representing a little more than 1 grain of emetine—once a day in the evenings with the last meal, and never on an empty stomach, as was customary with ipecacuanha. The reason for this is indicated in Dr. Dale's paper, already quoted. It was thought that it might be better to administer the drug three times a day in 1-grain doses; but in some cases in which this treatment has been tried the results, so far as they have yet been ascertained, do not seem to have been appreciably different from those just described. When practicable it is best to keep the patient in bed during treatment. In cases where much sickness is produced it might be expedient to diminish the daily dose, but as this might also diminish the efficacy of the treatment it is clearly better that the patient should temporarily suffer than that his amœbæ should permanently persist.

In one of our patients (No. 3) the drug had to be stopped after five doses had been given, and we have now a letter from another patient saying that five doses have so upset him—nausea, vomiting, and diarrhœa—that he cannot continue the treatment. We describe these symptoms because we think them important, but, on the other hand, it is only fair to say that many people can take the full course of 36 grains with no untoward results. The removal of the amœbæ and their cysts is, however, so much more important for the patient—not to mention the public at large—than the temporary inconvenience that this removal may cause him, that too much emphasis should not be laid upon what has been, after all, the only drawback in our experience to the use of the drug.

Evidence derived from our own cases, together with that adduced by Dr. Dale, has convinced us that emetine bismuth iodide is far more efficacious than emetine hydrochloride, given hypodermically, in removing the cysts from the fæces of chronic carriers; and in our opinion it should henceforward be generally employed in such cases—at all events, until a more ideal treatment is forthcoming.

TUBERCULOSIS AND THE WORKING MAN.—We learn from the *Derby Daily Telegraph* that an important decision was reached by the High Court of Foresters at Cheltenham last week. After a long discussion it was decided that members receiving benefit whilst suffering from tuberculosis might with special consent of the court do open-air work prescribed for them by a medical practitioner. Some delegates expressed their anxiety lest the order might result in the exploitation of sweating. The experiment will be watched with keen interest by all those interested in the "after-care" of tuberculous patients.

THE

INTRAVENOUS INJECTION OF OXYGEN GAS AS A THERAPEUTIC MEASURE.

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FOR some time it has been the practice of one of us (Tunnicliffe), when using saline venous injections, either simple nutrient (glucose and lecithin) or medicated, to use not simple saline solution but oxygenated saline solution. We are quite aware that the quantity of oxygen introduced by this method is very small as compared with the oxygen requirement of the subject, nevertheless cyanosis is rapidly alleviated by the use of such solutions, and we have observed that more rapid and generally better results are also produced by such (oxygenated) solutions *qua* their nutrient and medicinal content than by similar solutions, the basis of which is simple physiological saline solution. These results are, of course, in accord with those obtained in perfusion experiments in the laboratory. Several months ago when one of us (Tunnicliffe) was talking this matter over with Dr. F. S. Locke we were made aware of the interesting fact that when pure oxygen gas is introduced directly into the veins of animals the latter do not necessarily succumb to gas embolism.

Our interest in this matter was further stimulated by reading the accounts of the respiratory phenomena following the inhalation of the poisonous gas to which our soldiers have been exposed in the present war. We understand that in these cases the inhalation of oxygen is both difficult and relatively inefficacious. Difficult, because of the constant cough and expectoration; inefficacious, because of the copious secretion present in the pulmonary bronchioles and alveoli. Apart from these cases, the occurrence of which is now to a great extent happily prevented by the use of appropriate helmets, there must occur to clinicians instances in which the relief by the intravenous injection of oxygen of an acute cyanosis, either unrelieved or from the nature of the case impossible to relieve by the inhalation of the gas, might be of very considerable therapeutic value. These considerations, and the results we had already observed from the intravenous injection of saline solutions holding necessarily relatively small quantities of oxygen in solution encouraged us to hope that we should be able, without risk to the patient, to introduce into the veins a quantity of oxygen gas sufficient to exert a definite therapeutic effect, and thus both to relieve a cyanosis already present and to prevent its occurrence under conditions which would otherwise produce it.

Earlier Investigations.

Oxygen gas was discovered by Priestley in 1775, and as early as 1811 Nysten[1] made a most interesting series of experiments upon the effect of the injection of various gases, including oxygen, into the veins of dogs. His method generally was to introduce the gas intermittently into the jugular vein in quantities of from 20 to 50 c.c. at a time, repeating the injections after intervals of time varying from 2 to 15 minutes. As a fact, he found that if he injected from 100 to 150 c.c. of oxygen gas into the venous system of a moderate-sized dog in doses of 20 c.c. at a time, allowing intervals of from 3 to 4 minutes between each injection, the animal seemed entirely unaffected by the injections. In a further experiment, however, in which he injected 200 c.c. in doses from 30 to 40 c.c. at a time and made the last two injections at 1 minute's interval, the animal died. Nysten records the occurrence of loud gurgling cardiac murmurs after the injection and also that the whole blood was of arterial colour. Some further experiments upon the result of the injection of nitrogen into the jugular veins of dogs made by this observer are also of considerable interest to us (*vide infra*). He injected into the vein of a dog weighing

[1] Nysten: Recherches de Physiologie et de Chemie Pathologique, Paris, 1811.

from 7 to 8 kg. quantities of nitrogen varying from 60 to 100 c.c. in doses of 20 c.c. at a time. Speaking generally, two injections at from 1 to 3 minutes' interval were not attended with any serious result.

Demarquay[2] made a similar series of experiments, and, in general, confirmed Nysten's results. He says that he is convinced that it is possible by making use of small doses to inject into the circulation considerable quantities of oxygen gas without producing any grave symptoms. In spite of this statement, however, Demarquay did kill an animal by the injection of oxygen gas into its jugular vein. Unfortunately, he gives neither the weight of the animal nor the quantity of oxygen. He made, however, the interesting observation that in no case did the venous blood of the injected animal become exactly like arterial, but that for some time after the injection of the oxygen the edges of artificially made wounds remained red and vascular. From this latter fact he drew the conclusion that oxygen injected into the veins remains at least in part fixed, and is not entirely used up in respiration. This observation is of interest to us with regard to three of our cases (*vide infra*) in which the beneficial result of the intravenous injection of oxygen was certainly more permanent than could apparently be explained by the mere relieving of the cyanosis.

Gaertner[3] made a series of observations upon the effect of introducing gaseous oxygen into the veins of dogs. He used a continuous stream of oxygen. He observed the occurrence of loud cardiac murmurs during the administration of gas. In the animals which died he found bubbles of oxygen in the right ventricle, but never observed any in the left. He states specifically that the flow of blood containing oxygen bubbles does not obstruct the circulation through the lungs. He found that if means were used to greatly limit the respiratory oxygen the symptoms of asphyxia were much delayed and alleviated by the simultaneous administration of intravenous oxygen. He attaches great importance to the stream of oxygen being slow and continuous, and states that any dangerous symptoms which may occur may at once be relieved by discontinuing the administration. His work, he admits, was hurried in order that he "might claim priority." He suggests that intravenous oxygen might be used in the case of man, but he specifically states that he can make no suggestion with regard to method or rate of flow. He quotes Nysten and Demarquay. His observations were entirely confined to dogs, and he adds very little to the work of these observers except that he used a continuous stream instead of intermittent injections.

Stuertz[4] made an elaborate series of experiments upon the respiratory exchange occurring in dogs under the influence of the continuous intravenous injection of oxygen. His conclusions are that the oxygen introduced in this way is almost entirely used for respiratory purposes, and that a considerable proportion of the oxygen necessary for respiration can be introduced in this way. In his opinion the oxygen is best introduced not continuously but intermittently. He disagrees with many of Gaertner's conclusions, and from his experiments, which were made on dogs, confirms the results of other observers with regard to the absence, or at any rate infrequency, of gas embolism.

Mariani,[5] using pure oxygen and an elaborate apparatus, though less elaborate than that of Stuertz and Gaertner, introduced oxygen into the dorsalis pedis vein in man. The case was a dying phthisical subject. In half an hour 80 c.c. were given, then a pause, and then 40 c.c. in a quarter of an hour. The pulse and respiration of the patient were improved. The injection was not repeated, and the patient died next day.

In a recent German text-book[6] the author in a footnote makes the remark that oxygen can be introduced directly into the veins in man as a treatment for cyanosis of all kinds. No reference to literature is given, and no directions with regard to quantity or technique. With this conclusion we may say at once we totally disagree. Its seems to us a flagrant instance of German book-making, and likely to have as a result most serious consequences.

[2] Demarquay: Essai de Pneumatologie Médicale, Paris, 1866, p. 637 *et seq.*

[3] Gaertner: Wiener klin. Woch., 1902, p. 691.

[4] Stuertz: Zeit. für diet und physik. Therapie, 1904, p. 67.

[5] Mariani: Riforma Medica, 1902, p. 194.

[6] Schwalbe: Handbuch der therapeutischen Technik, 1915.

Technique.

Our own observations were made exclusively on man. We felt that in so far as the conditions calling for the intravenous administration of oxygen would be urgent ones, the apparatus required would be simple. We therefore dispensed with the elaborations used for the experiments upon animals and employed the following. An ordinary cylinder of Brinn's oxygen, to which was attached a Brinn's endurance regulator. A convenient length of pressure tubing connected at one end to the regulator, at the other to a piece of bent glass tubing, which was drawn out at the end, and passed through one of its necks to the bottom of a two-necked wash-bottle. From a similarly bent piece of glass tubing, passing for about an inch through the other neck of the wash-bottle, a further length of pressure tubing passed and was at its end attached to a fine hollow needle. This latter piece of pressure tubing was broken by the insertion of a glass T-piece. To the cross limb of the T-piece a small length of pressure tubing was fixed, which could be closed or opened by a screw clip. The fine hollow needle was introduced directly into the vein after the latter had been carefully dissected out. The wash-bottle was filled with a 2 per cent. sodium carbonate solution; before commencing the injection this was blown out by means of passing a stream of oxygen through the tubing and cannula, leaving just sufficient in the bottle to wash any further gas emerging from the cylinder.

The regulator was now set by means of the thumbscrew so that 60 bubbles passed through the wash-bottle per minute. The volume of gas emerging from the cannula corresponding to a given number of bubbles passing through the wash-bottle per minute was ascertained previously to the use of any regulator or wash-bottle or cannula by means of an ordinary eudiometer. At the end of any given administration the volume of gas passing through the cannula was also tested by the same means. In this way, by taking the time of the injection, we were able to estimate the amount of oxygen that had been given. If, during the administration, we desired to increase or diminish the rate we counted the bubbles passing through the wash-bottle, took the time for which they were given, and subsequently estimated the amount of gas emerging from the cannula with the same rate of bubbles passing through the wash-bottle.

We found it convenient to use the cross-limb of the T-piece, inserted into the tube between the wash-bottle and the cannula, as a kind of by-pass. When we increased the rate of flow we partially opened the screw-clip connected by the pressure tubing with the cross-limb of the T-piece and closed it gradually when the desired rate was established. By this means any sudden rush of oxygen into the vein was prevented, and sufficient oxygen passed during the change of rate to prevent blood-clot occurring in the cannula. This latter point we found very important, as from our experience we should say that displacement of a clot is a more fertile source of danger to the patient than introduction of oxygen.

Before we began our observations we endeavoured to obtain an absolutely pure oxygen. Such oxygen can be obtained, but owing to war conditions we were unable to obtain any. The oxygen we actually used, as we have said above, was Brinn's oxygen; this contains, or may contain, 1·5 per cent. of nitrogen (we believe it is obtained by fractional liquefaction of air). In the light of further knowledge and of Nysten's experiments upon the injection into the veins of pure nitrogen gas we do not think this quantity of nitrogen of any importance. The veins we used were numerous. The one we eventually found most convenient was one of the small veins on the dorsum of the foot. In our first observation we used two veins simultaneously. From the theoretical standpoint we thought this would be advantageous. We subsequently found, however, that we could introduce quite sufficient oxygen to relieve cyanosis by using one cannula only and also that having two cannulæ considerably complicated the technique.

Results.

The result of our observations is that oxygen gas can be introduced into the veins in quantities from 500 to 1000 c.c. at the rate of from 600 to 1200 c.c. per hour. Cyanosis and the dyspnœa attending it are rapidly relieved; the rate we usually begin with is 500 c.c. per hour. The more cyanosed the patient, the better is a rapid rate tolerated. As the cyanosis is reduced the rate should be diminished.

During the administration the pulse should be watched and the heart auscultated frequently. Loud cardiac murmurs more allied to stomach or intestinal rumbles in character than to ordinary cardiac murmurs may, in fact often do, develop during the administration. These murmurs are not an indication to stop the administration, but, as a matter of fact, with careful administration they never need occur at all. Irregularity in a previously regular pulse or increased irregularity in a previously irregular pulse is an indication to cease the injection. This phenomenon, in our experience, is preceded by a soft systolic murmur heard over the area of the tricuspid valve, and this murmur should be listened for. The metallic gurglings described above are almost certainly due to the gas being churned in the heart. The soft systolic murmur, on the other hand, and the irregularity of the pulse are probably due to acute dilatation of the right side of the heart.

In our experience the best method is to inject the gas for periods of from 10 to 15 minutes with pauses of two or three minutes between, injecting during these pauses just enough gas to prevent clotting in the cannula. We have only had one case which presented any unfavourable symptoms, and we think they were entirely due to faulty technique in that we increased the rate too rapidly. This was our first case and we were using two cannulæ.

The patient had been having intravenous oxygen at the rate of 600 c.c. per hour for more than 20 consecutive minutes. We then rapidly doubled the rate. The patient was an old man with chronic respiratory disease. The cyanosis had been completely relieved before we increased the rate. Soon after the increase of rate a soft systolic murmur was heard over the right side of the heart and almost immediately afterwards the pulse became irregular. The patient began to yawn, and in answer to a question said he felt giddy. Shortly afterwards both his hands dropped to his side and his legs became flaccid, and he exhibited an extensor plantar reflex on each side. He then appeared to lose himself and made no reply to questions. His colour kept good, his pulse became no worse, and his respiratory movements were slow but regular. The injection was stopped and he was sent back to bed. He rapidly revived, and half an hour afterwards he was sitting up in bed quite conscious and comfortable, and the plantar response was flexor on both sides. The patient's only complaint was of a slight numbness in his hands and feet. This continued with diminished intensity for a day or two and then disappeared. The improvement in his colour and breathing lasted some considerable time after the injection, and the patient himself maintains that it has lasted ever since.

As we related above, this is the only case in which we have had any untoward effects at all, and we attribute them to a gush of oxygen through both cannulæ upon doubling the rate of injection in a patient who had had oxygen injected continuously for 20 minutes previously, and in whom the cyanosis had been completely relieved. With regard to the apparently lasting benefit experienced by this patient we may quote two other cases in which also apparently a lasting improvement occurred.

One was a case of malignant disease of the mediastinum with pressure upon the roots of both lungs and double pleural effusion. This woman was deeply cyanosed, and was the subject of acute attacks of life-threatening dyspnœa which eventually were only very partially relieved by the inhalation of oxygen. This patient was treated by intravenous injection of oxygen which was continued for one hour. The cyanosis was immediately relieved, and subsequently the dyspnœa attacks were relieved for a week, and the patient's condition improved; she had much less cyanosis and much less dyspnœa.

The second case in which apparently permanent benefit accrued was one of advanced pernicious anæmia. This patient was having frequent attacks of dyspnœa upon slight movement in bed, and also frequent attacks of vomiting. He was given an intravenous injection of oxygen for 40 minutes. His attacks of dyspnœa subsequently became less intense and his vomiting less frequent, and from then until the present time he has continued to improve. His condition before the injection was certainly desperate, if not moribund.[†]

In our experience the phenomenon to be feared as likely to cause serious symptoms during the intravenous injection of oxygen is dilatation of the heart. The ideal case for reaping benefit from this treatment is one in which the cyanosis and dyspnœa are due to acute respiratory difficulty and in which the heart is fairly healthy. We do not think the method is likely to be of benefit in the cyanosis and dyspnœa occurring in cases of morbus cordis in which there is marked degeneration of the myocardium. If it seemed desirable to adopt it under such conditions we should suggest that an intravenous injection of digitalin or strophanthin be given first. It is in this particular that we disagree most emphatically from the view quoted above from the German text-book that the intravenous injection of oxygen can be used to relieve cyanosis of any kind.

The object of this preliminary note is not to indicate the specific pathological conditions in which the intravenous injection of oxygen should be used, but simply to point out that in those cases in which the inhalation of oxygen either cannot be practised or gives inadequate relief, the intravenous method of oxygen administration, if carefully carried out in accordance with the above directions, is available to the clinician and will give therapeutic results.

† The patient is now (August 15th) at a convalescent home.

ON THE GLUTEAL FOLD IN SCIATIC NEURITIS.

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IT is hoped that these notes may serve to call attention to a fact in the diagnosis of sciatic neuritis which does not appear to have received much attention in the text-books. It is that the gluteal fold may be very poorly developed in this condition. Commonly it is absent altogether, and this may be the case whether the affection is unilateral, bilateral, or part of a multiple peripheral neuritis.

Although this observation is original in the sense that the writer noticed the condition for himself without external assistance, it is not claimed that it is novel; nevertheless, a search through the available neurological literature has been unsuccessful in finding any reference to the condition. In Gordon's book[1] there are two photographs which show the abolition of the fold; and Turner and Stewart[2] also give a picture which illustrates the condition. The first two, however, are instances of a different affection from that under discussion, and in all three there is considerable wasting of the limb, in addition to which there is some flexion of the lower extremity on the affected side. No reference can be found in Allbutt and Rolleston's System,[3] and neither Oppenheim[4] nor Dana[5] mention it in their text-books. In the photograph of a man with sciatica and scoliosis which the former author gives the gluteal folds are well marked.

It is well recognised that the gluteal fold is not formed by the lower and medial border of the gluteus maximus; indeed, this side of the muscular parallelogram crosses very obliquely the fold of the nates, as its fibres pass from above downwards and laterally. It is not a little surprising that authors have always been at pains to mention this fact, but the writer has found that their reasons for so doing are not quite extinct.

The fold depends upon the tension of the fascia and its adherence to the subcutaneous fat, the skin being creased when the thigh is extended upon the trunk—namely, in the erect position of the body. When the thigh is flexed, either in health or in disease, the fold is lost. Disappearance of the fold, in the absence of any alteration in position of the lower extremities, alters the expression of the buttocks. The chief action of the gluteus maximus is to extend the hip-joint, more especially in movements which require considerable muscular effort.[6] When the thigh is kept flexed, as in cases of hip disease, for example, the muscle atrophies from disuse.

It will be recalled that the sciatic nerve is so named only after it leaves the greater sciatic foramen. It is composed of two distinct sections, common peroneal and tibial (external and internal popliteal). The level at which the main trunk divides into its two component parts varies to a considerable extent.

The nerve-supply of the gluteus maximus is by the inferior gluteal nerve and the posterior cutaneous nerve of the thigh (small sciatic). Probably the muscular branch of the latter nerve is part of the former.[6] Parris[7] refers to the inferior

gluteal nerve as a branch of the posterior cutaneous nerve of the thigh. The fibres of these nerves leave the sacral plexus by the fifth lumbar and the first and second sacral nerves, the posterior cutaneous nerve of the thigh having an origin also from the third sacral nerve. Now the anterior divisions of the lower four lumbar and upper two sacral nerves divide into anterior and posterior parts[8] and it is the three nerves (L. 5 and S. 1 and 2) which give rise to the inferior gluteal nerve, which also, by their posterior parts, join to form the common peroneal section of the sciatic. The superior gluteal nerve supplies the gluteus medius and minimus and also the tensor fasciæ femoris.

The gluteal fold varies in degree in normal persons, but as a rule it is well marked. It is often duplicated and may be seen in triplicate. When it is poorly developed the subject can increase it usually by tightening up his gluteal muscles or by throwing back the trunk. Bending forwards or flexing the thigh cause the fold to be obliterated. The influence of flexion or extension is found only in association with tension of the fascia. The fold is well marked in people who have an excess of fat in the gluteal region, normal or pathological.

Now, to what cause is the obliteration of the fold in sciatic neuritis due? It must depend on flexion of the thigh or upon some alteration in the condition of the underlying structures beneath the fold. In my cases there was no flexion of the thigh. In some cases Laségue's sign was also negative—that is to say, the thigh could be flexed on the trunk, with the leg extended, without causing pain.[9] When the sign is positive, from stretching of the nerve, it is a certain indication of a degree of affection in the nerve fibres or in their sheath. The test is performed in the same manner as that employed in eliciting Kernig's sign in cases of meningitis, but the significance of the positive test differs in the two instances. It has been shown that Laségue's sign may be accompanied by momentary dilatation of the pupil, together with a raised blood pressure and an increase of the pulse-rate.[10] These signs occur in association with the pain and serve to support a diagnosis of sciatica in cases where malingering is suspected. Laségue's sign, as well as Kernig's, may be tested for with the patient in the sitting position.

Experiments prove that flexion of the thigh by itself stretches the sciatic nerve. On the other hand, flexion of the knee at once relaxes the nerve, and it is this position which the patient adopts in painful affections of the nerve. As he does so he unconsciously flexes the thigh also, the two movements being normally simultaneous.

Those patients with neuritis, in whom I have found the folds absent, invariably had abolition of the ankle-jerk.[11] This is an important fact in the diagnosis between a neuritis on the one hand and pain, whether local or referred, in the distribution of the nerve, on the other. It is submitted that the condition of the fold may be of considerable diagnostic value in these cases, and may, indeed, be of great importance in those patients in whom it is not possible to test the ankle-jerk. In cases in which the jerk is absent the Achilles tendon may be diminished in size.

As regards changes in the underlying structures, some of my patients had wasting of the gluteal muscles, which were soft and flabby, but certainly others had no perceptible wasting in this region, nor was there any which could be measured in the thigh or calf. In the absence of both wasting and flexion it is not easy to say how the loss of the fold comes about. In a man who fell on to his left buttock and developed a traumatic cutaneous neuritis, with anæsthesia over his left gluteal region so that he was totally unable to recognise that he was sitting on materials of dissimilar consistency, the folds were normal.

Abolition of the ankle-jerk in sciatic neuritis depends usually on loss of conduction of the message in the tibial or sciatic nerves or in the roots of the sacral plexus. It has been pointed out above, however, that the nerve-supply of the gluteus maximus is derived from the nerves which go to form the common peroneal trunk. It would appear, therefore, that in those cases of neuritis in which both the ankle-jerk and the gluteal fold are lost, the whole thickness of the sciatic nerve is affected. Yet such cases may show no weakness of the muscles supplied by the common peroneal (and this is more vulnerable, as a rule, than the tibial), and, indeed, we may see patients with this condition who have no complaint whatsoever and who are discovered by accident. Absent ankle-jerks in persons who have normal folds and who present no other signs of neuritis are not uncommonly discovered in alcoholics and others. They must then be looked upon as the solitary sign of a toxic neuritis.

The absence of the gluteal folds in people with peripheral neuritis would go to prove that the whole length of the nerve is affected, including the roots of the sacral plexus. I have not yet seen a sufficient number of patients from this point of view, however, to enable me to state whether the folds are always abolished in this affection, but those cases which are not severe as regards their motor and reflex functions certainly have normal folds.

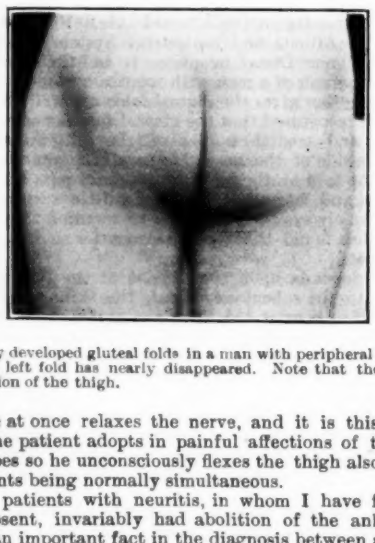
Mistakes may be made, as in Case 3. In this man repeated examinations were made by the writer and many other observers, but the knee-jerks and the ankle-jerks could not be elicited. It was noted, too, that the gluteal folds were poorly developed. Later, however, all these deep reflexes were obtained, but only with the aid of veritable refinements of reinforcement.

The value of the sign is certainly greater when one side only is affected, as a comparison can be made between the two folds.

In one man who had suffered from pain in the left calf for two months, but who was not incapacitated, I failed to obtain the ankle-jerk on that side. His fold was quite normal, however, and there was no other sign of disease. Six weeks later the ankle-jerk was elicited, but only when the tendon was struck on the outer side. No special treatment had been adopted, and I wondered whether the diagnosis of neuritis was correct or whether the jerk had never been absent.

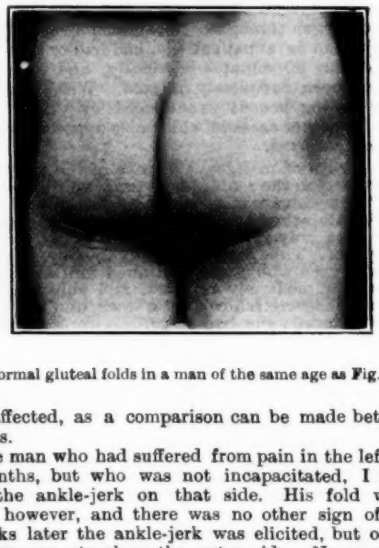
It should be mentioned that in none of my cases had any injection or nerve-stretching treatment been employed.

FIG. 1 (Case 2).



Poorly developed gluteal folds in a man with peripheral neuritis. The left fold has nearly disappeared. Note that there is no flexion of the thigh.

FIG. 2.



Normal gluteal folds in a man of the same age as Fig. 1.

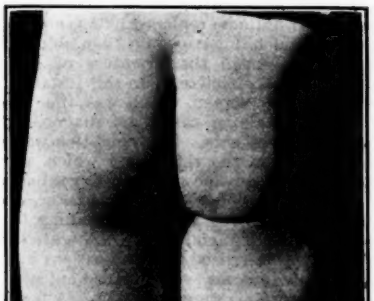
I wish to thank particularly Professor Arthur Robinson of Edinburgh, who has verified some of the anatomical statements, and Fleet-Surgeon J. Stoddart, R.N., who kindly took for me the photograph of Case 4.

Appended are brief notes of the cases whose photographs are shown. In none of the patients were there vaso-motor or trophic changes.

CASE 1.—Gunner, R.M.A., aged 36. Two years' history of pain all over the left leg and thigh; intermittent, but had never been two days without pain. Lasègue's sign positive on left side, and left ankle-jerk absent. Well-marked scoliosis, with the anal cleft running obliquely. Circumference of the left thigh and leg 1½ inches and ½ inch less than the respective measurements on the right side. Gluteal mass on the left side very flabby and fold poorly marked. A great difference existed between the two folds. This was, however, not nearly so marked as in Case 4, although in the latter the signs were only found by looking for them.

CASE 2.—Patient, aged 24, suffered from peripheral neuritis following dysentery. He contracted the latter disease at Gallipoli in September, 1915. When he reached England in December his knee-jerks and ankle-jerks were noted to be absent according to the patient, and he said that he had numbness of the legs. There was also muscular hyperalgesia of his calves. In March, 1916, his legs were still painful, and there was an extraordinarily well-marked condition of steppage gait. His knee-jerks were now present, but the ankle-jerks were absent. Lasègue's sign was positive. There were several tender points down the back of the thigh, and there was blunting to pin-pricks over the front of the shins. The gluteal folds were very poorly marked, notably on the left side. (Figs. 1 and 2.)

FIG. 3 (Case 4).



Absence of the gluteal fold in sciatic neuritis. Note that there is no apparent wasting of the muscles and no flexion of the thigh.

CASE 3.—Patient, aged 23, had apparent absence of tendon-jerks in lower limbs. These were elicited only with the greatest trouble. Gluteal folds poorly marked but symmetrical. This case is alluded to in the text.

CASE 4.—Gunner, R.M.A., aged 32. This man complained of nothing at all. He was found to have no ankle-jerk on the left side during a routine examination of the reflexes of the ship's company. Absence of the left gluteal fold was also observed (Fig. 3), but no other objective signs of disease were detected. He admitted to having had a "stitch in the calves" for two or three years, and he said that at night he sometimes had cramps in the toes and feet on both sides. He stood to attention without any difficulty, and was doing hard work without pain or discomfort. He had never been laid up. There was absolutely no evidence of wasting in the gluteal muscles and they contracted powerfully. The left calf was less than ½ inch smaller than the right. This is within normal variations. There was no motor weakness and no sensory change, either objective or subjective, on the occasions of examination.

References.—1. Diseases of the Nervous System, Gordon, second edition, pp. 315, 267. 2. Text-book of Nervous Diseases, Turner and Stewart, p. 158. 3. Allbutt and Rolleston's System of Medicine, vol. vii., 1910. 4. Oppenheim's Text-book of Nervous Diseases (Bruce), vol. i. 5. Dana: Text-book of Nervous Diseases, eighth edition, 1916. 6. Morris: Treatise on Anatomy, second edition. 7. Harris: Nerve Injuries and Shock, 1915. 8. Paterson, quoted by Professor Robinson in Morris's Anatomy. 9. Lasègue: Arch. gén. de Méd., 1864. 10. Boschi, G.: Il Policlinico, 1916, and THE LANCET, April 22nd, 1916, p. 872. 11. Carlill, Hildred: Diagnostic Importance of the Ankle-jerk, Journal of the Royal Naval Medical Service, vol. ii., No. 2; also The Ankle-jerks of a Ship's Company, vol. ii., No. 4 (in the press).

A CASE OF DILATATION OF THE HEPATIC FLEXURE OF THE COLON

GIVING RISE TO THE PHYSICAL SIGNS USUALLY ASSOCIATED WITH SUBPHRENIC PYOPNEUMOTHORAX.

BY W. J. MORRISH, M.D. LOND., M.R.C.S.

With a Note by T. D. ACLAND, M.D. Oxon., F.R.C.P. Lond., Major, R.A.M.C. (T.).

THE following case is thought worthy of record not only on account of the rarity of the condition but also because of the importance of recognising the possibility of its occurrence when deciding the question for or against an exploratory laparotomy in any case in which the normal liver dullness is replaced by a resonant note, but in which other evidences of intra-abdominal or intra-thoracic suppuration are absent.

The patient, aged 20, enlisted as a private in the Royal Army Medical Corps in January, 1914. As far as he knows he was quite well at the time, and had not had any other illness except chicken-pox, whooping-cough, and measles as a child. His bowels had never given him any real trouble, though they were inclined to constipation, which was easily overcome by a simple aperient. He arrived in Alexandria in September, 1914, and was on duty at a military hospital, where he remained for six months, during the first three of which he was nursing cases of dysentery, and for the last three waited upon convalescent medical patients. During the whole of this period he remained well. At the end of April he was sent to Gallipoli, where he acted as water-duty man to the battalion and helped at the first aid station. After he had been there for three and a half months he began to feel poorly, complaining of dizziness and of easily getting tired. He then developed diarrhœa, passing mucus all the time and blood on two occasions, but he still remained at work. After three weeks jaundice came on, and he was then sent into hospital, being transferred in a day or two to hospital at Mudros. Four weeks later he was sent to England as a case of "convalescent jaundice" and was admitted to the Tooting Military Hospital on Nov. 11th, 1915. No record is available as to his condition while in hospital at Mudros, but he says that on admission to the First East Lancs Field Ambulance his temperature was 101° F. While at Mudros his stools were examined, and he was given four doses of emetine, but no enemata. Ever since the first onset of diarrhœa his stools had remained loose.

On admission to the Tooting Military Hospital the patient complained of pains in the stomach and diarrhœa, and pain and loss of power in the legs, especially in the right, which had developed during the voyage home. His evening temperature was 98·6° and the pulse-rate 94. The heart and lungs were normal. On the morning of Nov. 14th the right ankle was found to be œdematous and the pain became worse, and by the 16th the left ankle was also swollen, but never so much so as the right

Major Acland, R.A.M.C. (T.), saw the patient soon after his admission and made the following note: "Patient is emaciated. Has moderate pyrexia and peripheral neuritis of lower extremities. Over the right lower quadrant of the thorax (which inspection shows to be considerably bulged), the liver dullness is replaced by a tympanitic note, which is unmistakable, and which gives in places a well-defined coin note: there is obviously some air-containing cavity or viscus. It is unlike pneumothorax and is certainly not a pulmonary cavity. Also the lung seems to expand over it during deep inspiration, so that probably it is below the diaphragm, in which case it might be that the liver has shrunk and fallen away from the chest wall, leaving the colon to ride over it, or it might be a subphrenic or hepatic abscess or a hydatid. The signs of an inflammatory lesion are inconclusive, since the abdomen moves well and the thoracic movements are not notably diminished. An X ray would decide the point as to which side of the diaphragm the lesion is, and I think this should be taken."

Next day Dr. Russell J. Reynolds reported as follows: "On X ray examination the patient's liver appears normal, ascending and transverse colon very much distended with gas and coinciding with the tympanitic area made out on percussion." Enemata of plain water and turpentine and water were administered daily and brought away large quantities of flatus, and some fæcal material, but the tympanitic area remained well defined, although the coin note could not always be elicited and the bulging of the side was less noticeable. The œdema, too, of the ankles and the pain in the shins steadily diminished and the patient was able to move his legs more freely. Massage to the colon and the limbs was ordered, but

after two applications to the abdomen he asked that it might be stopped as it made him feel sick. It was continued to the legs, and the improvement was for a time maintained. Between Nov. 11th and Dec. 13th the temperature was irregularly intermittent, but from that time onwards, with two short periods of fever (maximum 101°), it was seldom raised above normal, and the patient felt much better; the tympanitic area, however, still persisted, though it varied in size, and the coin note could not always be obtained. On Dec. 17th, further to elucidate the true nature of the condition, Dr. Reynolds skiagraphed the abdomen after a bismuth meal. It will be seen from the skiagram that the

Reproduction of skiagram showing the colon 24 hours after a bismuth meal.

hepatic flexure of the colon corresponds exactly to the tympanitic area marked out on the first examination.

At first the case seemed to do well, the pain in the limbs diminished, and the power of movement greatly improved, but in January, 1916, the patient began to suffer from increased looseness of the bowels which developed into an intractable diarrhœa, for which numerous remedies were tried without success. There was not at any time vomiting, though there were intermittent attacks of abdominal pain. As the condition gradually became worse it was decided to explore the abdomen in the hope of giving relief. The operation was successfully performed on March 8th by Mr. E. Gillespie, to whom I am indebted for the following note: "On making a median incision it was found that there was marked distension of the cæcum and ascending colon to the middle of the transverse colon. The cause of this was an extensive adhesion implicating the great omentum and passing from the great curvature of the stomach across the transverse colon to the duodeno-jejunal flexure. It was evident from inspection that peristalsis would give rise to tension of the gut and a kink. The portion of the great intestine distal to the adhesion was collapsed. The adhesion was divided and ligatured, the appendix was removed since the distal third had become sclerosed and the lumen almost obliterated, though this condition did not seem to be connected with the intestinal lesion. A caseating mesenteric gland in the iliac portion of the small intestine was found and removed. The stomach, duodenum, and gall-bladder were normal."

The immediate effect of the operation seemed to be beneficial. The abdominal pain became less, and for a time not only did the general condition improve but the patient began to put on a little flesh. Before long, however, the previous symptoms began to recur. An intractable diarrhœa resisted all remedies and he slowly lost ground. The emaciation became extreme. Gallate of bismuth, opium, salol, lead and opium, and pernitrate of iron by the mouth, and injections of silver nitrate and quinine by the rectum were tried to no purpose.

The only remedy which appeared to exercise any control over the diarrhœa was atropine given in doses of gr. 1/100 with tincture of opium, min. x. The patient wasted literally to a skeleton, and it is greatly to the credit of the nursing that, in spite of the fact that he not infrequently had as many as from 15 to 20 loose motions a day, he never had a bedsore.

Death occurred on Sunday, May 14th, and an examination of the abdominal organs showed that the ascending and transverse colon was dilated and that the walls were thinned. There was no evidence of ulceration or inflammatory thickening or abscess. The mucous membrane was atrophied and over considerable areas was denuded of epithelium. The small intestine showed similar change, but in a much less marked degree. The condition was one of chronic entero-colitis. There were a few small mesenteric glands, but no inflammatory changes were found in the liver, spleen, or kidneys. By special request the thoracic organs were not examined.

Note by Major T. D. ACLAND, R.A.M.C.

The condition found in the case narrated above is of sufficient rarity to warrant its being put on record. A subphrenic pyopneumothorax on the right side, resulting from suppuration connected with the liver, duodenum, or appendix, or from suppurating hydatid cyst, is, unfortunately, not uncommon. Again, partial obliteration of the liver dullness, owing to the presence of gas in the peritoneal cavity or to the colon, distended as a result of the softening and weakening of the walls from chronic dysentery or from obstruction below, or from paralysis (such as that which occurs in peritonitis), over-riding the organ, is only too frequently met with. To find practically the whole of the normal liver dullness replaced by a tympanitic area giving rise to a well-marked coin percussion note, without either acute atrophy of liver, transposition of viscera, or evidence of some inflammatory lesion in the abdomen or thorax, is unusual.

In cases in which the hepatic flexure of the colon is greatly dilated from any cause the liver is generally pushed up, rather than away, from the chest wall; and if this latter condition is found it is unusual to find more than the lower two inches of liver dullness replaced by a tympanitic note.

The only case which I have so far been able to find in an extensive search through the literature of the subject [1] is one recorded by M. Béclère.[2] In this instance, with the help of a radioscopic screen, which was then just coming into use, an air-containing cavity was diagnosed below the diaphragm on the right side. The condition was associated with physical signs in the right lung which were at first thought to be due to advanced pulmonary tuberculosis and subsequently to an interlobar empyema. Later, when by the aid of the X ray screen an air-containing cavity was detected below the diaphragm, which obliterated the normal liver dullness, it was surmised that the patient was suffering from a subphrenic abscess which communicated with a bronchus. Both surmises were incorrect. A few days later the patient died almost suddenly, and post mortem it was found that the supposed subphrenic abscess was a local distension (ectopic) of the colon, and had no connexion of any kind with the pulmonary lesion, which was bronchiectasis. In the case recorded above there were no signs of pulmonary or abdominal disease to lead one astray, while the fact that the cavity altered in size aroused a suspicion that it might, in spite of its position, possibly be due to the distension of one of the hollow viscera—e.g., stomach (by transposition) or colon. A bismuth meal put the question beyond doubt.

The reproduction of the skiagram taken by Dr. Reynolds shows the distended hepatic flexure of the colon 24 hours after taking a bismuth meal. It will be noted that the ascending and descending colons are comparatively empty and that the hepatic flexure looks as if it had a kink in it, such as might result from adhesions formed by a local peritonitis or an old tuberculous gland.

[1] Cf. Subphrenic and Other Forms of Peritoneal Abscess, by T. D. Acland; A System of Medicine, edited by T. C. Allbutt and H. D. Rolleston, 1907, vol. iii., p. 1008.

[2] Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris, 1899, pp 485 and 506.

TYPHUS IN GLASGOW.—Dr. A. K. Chalmers, medical officer of health of Glasgow, reported last week to his committee the occurrence of eight cases of typhus in Partick during the month of July. The first cases recognised sickened between June 30th and July 3rd; a second group of cases occurred on July 16th and 20th; and a further group, being the third generation of contacts, occurred on July 29th and 30th. The simultaneous sickening of the four persons who formed the first group suggested to Dr. Chalmers an undiscovered infection which might produce further results elsewhere.

Reviews and Notices of Books.

Squire's Companion to the British Pharmacopœia.

By PETER WYATT SQUIRE. Nineteenth edition. London: J. and A. Churchill. 1916. Pp. 1712. Price 15*s.* net.

"Squire's Companion" is one of those books which having stood the test of time may be regarded as being above criticism. To medical practitioners and pharmacists it is familiar as a household word. The British medical man who does not know this book must indeed be a *rara avis*; its only fault is its size, for it is not a book one can conveniently carry about for ready reference, and its companionship is therefore restricted to the study and the consulting room. The nineteenth edition records advances in medical and pharmaceutical sciences almost up to the early summer of this year, which is saying a great deal, for anyone who has had anything to do with the preparation of a large volume of this nature, and one which must have a great circulation, can appreciate the difficulties in the way of keeping the matter quite up to date from p. 1 to p. 1712. One finds a description of the uses of hypochlorous acid as an antiseptic, the iodine treatment of wounds fully dealt with, and a reference to chloralamine. The compounds more recently employed in the treatment of syphilis—e.g., neo-kharsivan, galyl, and intramine—receive attention. If the author and his collaborators were prevented by the pressure of the times from completing their work so that it might appear more quickly on the heels of the new British Pharmacopœia, the users of the book will find compensation for the delay in the extra information the author has been able to include concerning therapeutical progress subsequent to the issue of the 1914 Pharmacopœia.

No change has been made in the general arrangement of the book as a work of reference; thus, a practitioner who has been familiar with "Squire" through one edition after another will know precisely where to find what he wants in the nineteenth edition. As formerly, the monograph on each substance gives first the Latin title, then the English title, then the French, German, Italian, and Spanish names under which the drug or its preparations are known; then follows a short description of the drug and, in the generality of cases, a short account of its usual method of preparation, solubility, medicinal properties, dose, prescribing notes, incompatibles, official preparations, preparations that are not official, antidotes, and other information. The medical portion of the book has been revised by Dr. Taylor Grant, and the notes on the medicinal properties of the drugs are really concentrated accounts of all that is worth knowing—for practical purposes—of the drugs in question. To prescribers these notes are very valuable, and hardly less useful are the prescribing notes which represent Mr. Squire's personal experience of over 40 years in the dispensing of prescriptions. Perhaps it is that pharmacists are rather shy about making suggestions to medical men, but authors of books of this class are not over-generous in their prescribing hints. And so we make the suggestion to Mr. Squire that in a future edition practitioners would welcome the inclusion in these notes of an occasional model prescription; for thoughtful practitioners recognise that the pharmacist often knows more about the art of combining drugs than does the doctor. The objection might perhaps be made that the book is already big enough, but a few extra pages would not noticeably add to its size, while they might add greatly to its usefulness.

The changes that have been made in the 1898 and 1914 British Pharmacopœias, the alterations in the strength of the various preparations, are clearly indicated. One of the distinctive features of the first edition of "Squire's Companion," published more than 50 years ago, was the note on solubility, and this has continued to be a feature through all subsequent editions; these solubility figures are very useful to prescribers, and in the present volume is included a number of figures specially determined for the nineteenth edition, and in any cases of doubt previous figures have either been confirmed or new figures have been introduced. The paragraphs dealing with "tests" have been re-written. Besides constituting a critical comparison between the tests of the British Pharmacopœia and those of the United States and German pharmacopœias, they contain many references to work done in Mr. Squire's laboratory. The section on chemicals and reagents used in qualitative testing, volumetric analysis, and so on, is of greater interest to pharmacists than to medical men, but it may be added that this section has been improved considerably. Dr. R. T. Hewlett has revised the useful chapter on therapeutic agents of microbial origin.

The Mortality from Cancer throughout the World.

By F. L. HOFFMANN, LL.D. New Jersey, U.S.A.: The Prudential Press. 1915. Pp. xv.–826.

THE bulky volume on cancer mortality published by the Prudential Insurance Company of America comprises 220 pages of letterpress by Dr. Hoffmann and 600 pages of appendices and index giving statistical data on the subject from many countries for a varying number of recent years. Dr. Hoffmann is firmly convinced that the recorded increase in cancer mortality throughout the world denotes a real increase in the frequency of the disease, and this volume, although "primarily intended to supply the necessary data for a scientific study of the cancer problem from the statistical point of view," in reality marshals the most heterogeneous data in support of this conviction. Throughout the book one is reminded again and again of the pre-eminent position taken by the work of English statisticians in the long-drawn-out discussion of this thorny problem. The reports of the Registrar-General, King and Newsholme, and the Imperial Cancer Research Fund's publications are referred to repeatedly, and the guarded statements of the Fund's reports on the significance of the recorded increase in cancer mortality are criticised with much energy.

Although the importance of actuarial correction for age and sex is insisted upon, many of the tables merely give crude rates obtained by multiplying the total deaths from cancer by 100,000 and dividing by the total population. It would have been preferable to exclude the data from those countries in which some kind of actuarial correction for age and sex is impossible rather than increase the bulk of the data by sacrificing accuracy and possibility of comparison. The fact is undoubted that when all possible actuarial corrections have been made the cancer mortality of most countries shows a definite increase, and the crux of the problem lies in the difficulty of estimating the fraction of the increase which should be attributed to improvements in diagnosis and in registration of the causes of death. To take an extreme example, the mortality from cancer in Manila rose from 15·8 per 100,000 of population in 1905 to 30·7 in 1910. No one is so foolish as to believe that cancer has doubled in frequency in the Philippine Islands during five years of American administration. In a less degree the same difficulty of interpretation of cancer statistics adheres to the data from countries such as England and Wales and the United States. It is also interesting to note that the cancer death-rate has diminished during the last ten years in Switzerland, the country with the highest rate. Does this indicate a diminution in the frequency of cancer in Switzerland? The tables published by Dr. Hoffmann do not solve either of these problems, nor is it justifiable to brush the Swiss figures aside on the assumption that, the cancer-rate in that country being double the average for all other countries and having reached a maximum, it must diminish. As cancer accounts for about one-tenth of deaths from all causes there is room, even in Switzerland, for a measurable increase.

The data are not available, nor is the time yet ripe for a conclusive discussion of the full significance of the recorded increase of cancer mortality and the volume under review, while giving much of the available data in compact form, merely emphasises how far we are still removed from an objective survey of deaths from cancer. The book is well printed and most carefully revised, but a larger *format* would have facilitated reference to the longer tables.

JOURNALS.

Parasitology. Vol. VIII., No. 4. June, 1916. Cambridge University Press. Price 10*s.* net.—In this issue there is an important article by Dr. G. S. Graham-Smith, entitled "Observations on the Habits and Parasites of Common Flies." The work

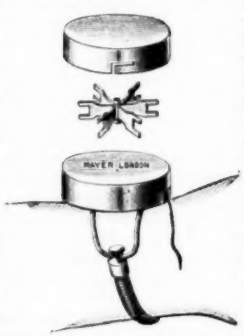
described in the paper has engaged the author during the period between 1912 and the date of publication, and many of the results obtained should prove of unusual interest to those employed in public health work. The more important of the conclusions arrived at by the author may be briefly summarised as follows: 1. Amongst the common species of flies it was found that the majority passed the winter as pupæ or, rarely, as larvæ which pupate in the spring. The pupæ or larvæ are usually buried within two or three inches of the surface of the ground, but occasionally are found on the surface in sheltered positions. 2. The wintering habits of *Musca domestica* are still obscure. 3. The emergence of the "winter" pupæ is dependent upon the mean temperature of the immediate surroundings reaching a certain "critical" point, which differs for each species. The "critical" point for *Calliphora erythrocephala*, *Fannia manicata*, and *F. scalaris* is about 48°–50° F. 4. Flies emerging from "winter" pupæ are always more hardy than those of subsequent generations. The males usually emerge before the females. 5. The author's observations on blow-flies, confined in a large, open-air, protected cage, lead him to believe that "the estimations of the multiplication of flies" made by Howard and Fabre "are very much exaggerated." 6. The normal duration of life of the blow-fly, in summer, is about 30 days. The influence of the weather on the death-rate of flies is dealt with and the greatest mortality was found to occur on sultry days. 7. Of the flies which enter houses, only *M. domestica* remains for any long period. *C. erythrocephala* enters for the purpose of ovipositing on meat, *S. calcitrans* for temporary shelter, and *F. canicularis* "for some purpose at present unknown." The author suggests that *M. domestica* requires a high temperature for the development of its eggs and remains indoors until ready to oviposit. 8. Amongst the more important agents which tend to limit the numbers of flies are braconid and chalcid parasites, which bring about the destruction of large numbers of larvæ and pupæ. The braconids, *A. manducator* and *A. cephalotes*, and the chalcid, *M. acasta*, hibernate in the fly puparia as larvæ; and experimental work with a view to the destruction of flies by their agency, is now being carried on. The author also deals with the part which flies play in the distribution of pathogenic bacteria, and points out that "all species of flies which visit excrement and decaying animal matter also visit ripe fruit." He adds that "great contamination of fruit on trees and exposed for sale in shops with fæcal and putrefactive bacteria is caused by flies and wasps." Numerous charts and illustrations accompany the article, which contains much valuable information for the practical sanitarian.

Journal of Cancer Research. Vol. I., No. 2, 1916.—The second number of the new *Journal of Cancer Research* begins with an interesting review of tumour immunity, by Dr. Tyzzer. Starting from the conception, first clearly enunciated by Russell, that natural resistance to tumour inoculation is merely the consequence of capacity to react with immunity to tumour inoculation and susceptibility the failure of this reaction, Dr. Tyzzer utilises the varying resistance of several strains of mice to one tumour strain to analyse tumour immunity, and to throw light on the nature of cancer. By carefully planned and recorded breeding experiments it is shown that resistance is not transmitted as a Mendelian character when resistant and susceptible strains are crossed, and the conclusion is drawn that resistance depends on the coöperation of a number of independent factors. Tumours themselves are regarded as "somatic mutations" arising in the body cells and breeding true on propagation. Dr. E. T. Bell and Dr. A. T. Henrici describe two renal tumours from the rabbit. The first of these corresponded in structure to the adeno-sarcomata of man, with undifferentiated cell masses tending to develop tubules and indications of glomeruli. The second case was of similar type but rather more tubular in structure. The authors suggest the name *Nephroblastoma* for tumours of this type. Dr. R. A. Lambert gives a general survey of the application of *in vitro* culture to cancer problems. Five cases of thyroid tumour in the sea bass (Serranus scriba and cabrilla) are described and figured by Dr. Marsh and Dr. Vouwiller. In structure the tumours varied from colloid goitres to adenoma, and there was no definite evidence of malignancy. Professor Gaylord adds remarks on thyroid enlargement in fish. The effects of cancer tissue on protozoa are utilised by Professor G. N. Calkins to study the biochemical differences between normal and tumour tissue. He finds that cancer tissue added to cultures of Didynium nasutum, a predatory infusorian, stimulates the rate of division in moderate doses more than does extract of normal epithelium. Larger doses have a lethal action, absent when normal tissue is used. The results are correlated with the rôle of products of tissue autolysis in chronic irritation associated with the development of cancer. The last paper, by Dr. Erwin F. Smith, deals with crown gall of plants and its relation to human cancer. The plant tumours due to Bact. tumefaciens are well described and figured, and the view put forward that the tumours of man and animals are due to a similar organism.

New Inventions.

A WRISTLET LIGATURE HOLDER.

I HAVE used the wristlet ligature holder here illustrated for many months, and find it very convenient as a time-saving device where a number of bleeding points have to be tied in the course, for example, of such operations as removal of the breast, glands in the neck, and thyroidectomy. The lid is removable, and when secured by a bayonet catch leaves a small slit-like aperture through which the ligature material emerges. Owing to its small bulk it can be worn throughout an operation without inconvenience. The skeleton reels are removable, and a number can be kept ready wound and sterilised. A reel will easily hold 40 feet of a fine thread. If gut be used, iodine should not be utilised in its preparation, owing to its action on the metal.



The instrument has been made to my design by Messrs. Meyer and Meltzer, of Great Portland-street, W.

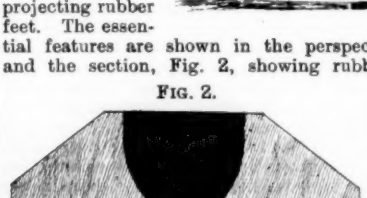
PERCIVAL P. COLE, M.B. CH.B. Birm., F.R.C.S. Eng.
Queen Anne-street, W.

AN EGG-CUP FOR SINGLE-HANDED USE.

AN egg-cup for the use of men with only one arm has been designed by Mr. Magnus Volk, R.A.M.C., voluntary worker by appointment at the 2nd Eastern General Hospital, Brighton. The cup is a wooden disc, 5 inches in diameter, with projecting rubber feet. The essential features are shown in the perspective view, Fig. 1, and the section, Fig. 2, showing rubber feet projecting one-sixteenth of an inch. The cup sits firmly on the tablecloth even when only one hand is used, and the hollow is deep enough for the contained egg not to tilt. The cup has proved most useful to crippled men in the hospital. The illustrations are one-third natural size.

FIG. 1.

FIG. 2.



THE NEW HULL SANATORIUM.—The new sanatorium erected by the Hull corporation on the Cottingham Castle estate, the foundation-stone of which was laid by the King in 1914, was opened by the Lord Mayor of Hull on August 5th. It covers 100 acres and has cost £25,238, of which £10,800 have been paid by the Government. The buildings consist of an administrative block, with pavilions for males and females and a hospital for advanced cases. The pavilions provide for 80 beds and the hospital block for 40 beds.

THE LANCET.

LONDON: SATURDAY, AUGUST 19, 1916.

The Manufacturing Chemist and His Opportunity.

IF we may judge from the prodigious scale on which munitions are now being made in this country very little fear need be entertained that the manufacturing chemist and his staff will fail us in the time of peace. If swords can be made so can ploughshares. It must be remembered that behind all this gallant army of workers is the man of technical knowledge, who, to the surprise of many, has compounded his ingredients with the same success on the stupendous scale necessitated by the war as on the more moderate scale demanded by peace. This fact we feel bound to accept as a welcome sign of the skill and capability of our experts who, being caught in the sudden demands of an enormous emergency, were not found wanting. Surely the same willingness and devotion will be found when all arms are laid down, and when the consideration will be to beat the enemy in regard to the supply of peace munitions, of drugs, and of medicinals—things the manufacture of which, owing to our lethargy in the past, he has been able practically to monopolise.

Signs are not wanting that we are advancing in this direction, for prices are falling on certain commodities which formerly we derived wholly from the enemy; and we have reason for believing that British manufacturers are turning serious attention to the production of a great many articles of medicinal, industrial, and domestic importance. Slowly but surely are being laid the foundations of new industries which it is hoped will render us independent, at all events in many directions, of external supplies. A serious difficulty in such enterprises will of course arise where nature has not endowed us with a large amount of raw material, but it is good to know that in many cases our opportunities are equal to, if not greater than, the enemy's. A special fiscal policy to meet the case may be required, and will undoubtedly be forthcoming if needed. That is a matter we do not discuss; what we desire to point out is that there are just as clever and capable chemists in this country as in any other, who, if only they are given the same facilities, opportunities, and financial backing as the manufacturing chemists in Germany, for example, receive, would occupy the premier position. This position is still held by us as discoverers and pioneers of research. Here we have never lost predominance, but we have lost industrial supremacy owing to a steady and persistent refusal of the State to afford capital and encouragement necessary to sustain work and to bring it into the provinces of practical application. The ground in many directions is being prepared, and if our manufacturers can be guaranteed that capital outlay on new extensions of business is not going to be destroyed by unfair competition when the war is over, we know that they will prove themselves capable of turning out goods of the highest standard. In proof we may mention the rapid strides which the glass trade is making in supplying glassware equal in all detailed particulars to material hitherto obtained from the enemy. Apart from special glass required in industrial applications, we find that many of our glass-making firms are undertaking the manufacture of glass adapted for pharmaceutical purposes, optical lenses, X ray bulbs, thermometers, "shell" for the artificial human eye, glass also for the artificial lens, things never made a special department of before in the history of glass manufacture in this country. This is only one example of the spirit that is steadily and surely growing amongst our chemists and manufacturers, and we may be sure that the same spirit is active in other departments of our industries.

It is the great demand for munitions which makes it difficult to manufacture freely just now many well-known medicinals and chemicals. The curious fact is that the basis of munitions and of certain drugs is one and the same thing. To take an example, the salicylates have as their starting point phenol, but so has picric acid. The urgency of things gives the first call to an explosive and not to a drug, and so salicylic acid, aceto-salicylic acid, and the salicylates are rare and dear. This, of course, is no reproach to our chemists; they cannot make munitions and drugs at the same time when the raw material of both is the same, and when to finish the war at the earliest possible date is the supreme consideration. Yet another example is that of benzene and its homologues; they are the foundation of dye-making, and are also the basis of the great nitro-explosives of the type of T.N.T., and for the moment the need of the explosive is more urgent than the need of the dye. But we may reasonably expect that the lesson of the war is not going to be lost by the leaders of our chemical industries, and it is to be hoped that they will receive the support of our administrators. Materials, financial backing, and all-round fair dealing are the things that are asked, and our brains and workers will not fail us.

The Status of the Certified Midwife.

IT is now 14 years since the provisions of the Midwives Act came into force in this country, and during this time the status of the certified midwife has gradually become more definite and the distinction more clear between her functions and those of the uncertified maternity nurse. The same provisions have recently been extended to Scotland by the Midwives (Scotland) Act of 1915, with the modifications suggested by experience, and legislation in similar form will shortly come into force in Ireland. The Midwives Acts prohibit any woman who is not certified under the Acts from

habitually and for gain attending women in childbirth otherwise than under the direction of a qualified medical practitioner, but we repeat it because the meaning of the law appears to escape some doctors. In certain disciplinary cases which the General Medical Council have recently had before them it has been shown that uncertified women have been in effect enabled to defy the law through the countenance, assistance, or connivance of qualified medical practitioners. This has been done either by practitioners paying perfunctory visits to confinement cases and signing legal certificates and kindred documents required—for example, in relation to National Health Insurance or notification to authorites—or by their countenancing in other ways a pretence that the uncertified woman was acting under the direction of a qualified medical practitioner. In some of the cases of this latter sort which have come to our knowledge the practitioner has acted inadvertently and without understanding the full mischievousness of his procedure, but in other cases this could hardly be pleaded.

The Executive Committee of the General Medical Council has now characterised such conduct as discreditable and tending to the defeat of the due working of Acts of Parliament which are of the utmost importance to the welfare of the poorer classes and therefore of the nation, particularly at the present time. The Executive Committee has therefore framed a draft notice for presentation to the Council at the November session stating that any registered practitioner who is proved to have covered an uncertified woman in the manner indicated will be liable, after the notice has been ratified by the Council, to have his name removed from the Medical Register. The covering letter which will accompany this notice when issued adds that the General Medical Council regards it as the duty of registered medical practitioners to coöperate with the constituted authorities in helping to secure the strict and effective administration of the Midwives Acts. That the practitioner's duty and enlightened interest here coincide can hardly be a matter for doubt at the present time. There are far too few civilian practitioners now available to attend all the parturient women in the country, and if the medical man cannot attend a labour himself he should prefer the attendance of a woman with at all events the standard of attainment implied by the possession of the Central Midwives Board's certificate. A certain conservatism in favour of old-established practices, some still surviving anxiety regarding the competition of the certified midwife, or even ignorance of the provisions of the Act, may have resulted in the covering of an uncertified woman. But the medical practitioner cannot any longer consistently with medical ethics or the law of the land give the uncertified woman the support of his authority unless he actually takes charge of the case himself.

It may be felt that the penal provisions of the Midwives Acts, and the suggested notice of the General Medical Council press hardly upon patient and doctor in cases of emergency, and where the supply of certified women is not equal to the demand for them. That this has not been forgotten is evidenced by a sentence in the covering letter calling the practitioner's attention to the fact that the penal provisions of the Acts do not apply to anyone rendering assistance in a case of emergency. The position of the medical practitioner in regard to the obtaining of assistance from maternity nurses who are not registered by the Central Midwives Board, or whose names have been removed from the Register has recently been elucidated in a correspondence which appeared in our columns between a practitioner and the President of the Board. Sir FRANCIS CHAMPNEYS stated that there was nothing to prevent a woman whose name had been struck off the Midwives Roll, or who had resigned, from acting as a monthly nurse under the instructions of the practitioner, with the proviso that the practitioner undertakes to attend the confinement whenever it occurs (day or night), even if normal. The Central Midwives Board in any case of dispute acts on the principle that the case belongs to the person who has undertaken to attend the confinement. We think the medical profession may rest assured that their interests have been fairly considered by the constituted authorities.

Annotations.

"Ne quid nimis."

SOLDIERS AND THE LAND.

A CONFERENCE has been sitting recently to consider questions connected with rural reform, and among other points to which its attention has been directed has been the part to be played in rural reform by those who, when the war has finally ended, will be discharged from their country's service. At the conference, which owed its origin to the Garden Cities and Town Planning Association, the importance of rapidly developing facilities for small holdings was insisted upon, but evidently doubts were felt as to the fitness of the class indicated for working small holdings and making a living out of them. The conference, therefore, has recorded a conviction that—

1. For ex-service men desiring to live on the land in the home country employment at wages, whether on farms or in schemes of reclamation or afforestation, affords the only practicable opportunity, at any rate in the first instance.
2. That urban ex-service men will not accept such employment unless wages and houses are greatly better than they were on the average before the war.
3. That both in recognition of the services of our sailors and soldiers and on grounds of national expediency the need of a Government policy and legislation to effect such improvement in wages and housing is immediate and urgent.

We are not prepared in any way to dispute the correctness of the conclusions arrived at, and regret the difficulties which are thus clearly indicated as lying in the path of a "back-to-the-land policy" and of its general and immediate development. A vista of contentious political questions is at once opened up. Can increased wages and better housing accommodation be provided by agriculture from its own resources, or would it be necessary to compass the desired result by means of State subsidies or protective measures at the expense of the community in general? The columns of THE LANCET are not adapted to the discussion of

such topics, and we can only record our opinion that "on grounds of national expediency" an extensive re-migration of the urban population to rural districts is greatly to be desired. It should find there the opportunity to live a healthier life than is possible in our great cities, but it will not find it easy to accumulate wealth, and there will be little in the way of the amusement to which it is accustomed to tempt it to remain. It should by its labours increase the food-supply of our cities and thus afford a better chance of healthy life to the workers remaining in them. This in itself would tend to compensate the country for any expenditure. The difficulty, however, of discussing questions of this kind is great on account of the uncertainty as to what the position of our great trades and manufacturing industries will be when peace comes, and as to the temptations which they will be able to offer to their workers to remain with them.

A GERMAN DOCTOR'S EXPERIENCES IN LONDON DURING THE WAR.

Dr. J. P. zum Busch has contributed to the *Deutsche Medizinische Wochenschrift* his experiences in England during the past two years. He is a medical graduate of Freiburg and a Member of the Royal College of Surgeons of England of many years' standing, and was for over 22 years prior to the war honorary surgeon to the German Hospital in London. He remained at his post until the beginning of May of this year. At the outbreak of the war, while the work of the hospital was much increased, the staff became more and more limited by resignations. At the same time the number of occupied beds was increased from 160 to 200. Dr. zum Busch became himself resident at the hospital in order to assist with the pressure of work, especially at night. He states that after labouring continuously for a year and three-quarters, during which time he "saw no green field" (his passport limiting him to a radius of 8 kilometres), he was interned at Stratford at three days' notice and repatriated on June 21st, owing, as the editor of the *Deutsche Medizinische Wochenschrift* alleges, to representations made by himself, this being an entirely gratuitous and unlikely assumption. Dr. zum Busch has for many years contributed letters on current affairs in England to the German journal, and this latest communication is entitled "My last letter from England." He naturally writes with considerable freedom to a circle of readers whom he knows to be sympathetic. He describes the disabilities under which the hospital laboured, criticises the restrictions imposed upon its work, and gives a vivid picture of the life in an internment camp, as he himself experienced it. Dr. zum Busch states that life would have been quite insupportable for him if he had not found constant comfort in his work and in the marks of kindness and affection shown him again and again by his good English friends. But he records with feeling that on the occasion of his internment no word of regret reached him from the management of the hospital for which he had laboured so long. The editor of the *Deutsche Medizinische Wochenschrift*, who contributes from week to week caustic editorial comments on the general as well as the medical aspects of the war, dots his colleague's i's to some purpose and expresses the conviction that his last English letter will remain as documentary evidence of "British humanity and gratitude."

ACUTE POLIOMYELITIS.

THE official weekly bulletin of the New York City Health Department for July 22nd has just reached us, and confirms the existence in New York of an epidemic of poliomyelitis which the telegrams have already foreshadowed. Attention in this country has been called to the epidemic by the distressing news that the daughter-in-law of the American Ambassador in London has succumbed to the complaint. For the week ending July 15th, 933 cases of poliomyelitis were notified, being considerably more than the sum of notifications of diphtheria, measles, and scarlet fever. During the same week 169 deaths occurred, as against 52 from all other infectious diseases. 143 of these were under 5 years of age, 25 between 5 and 15, and only 1 above this age. Of the 169 deaths 109 were boys and 60 girls. The bulletin contains information for the public regarding the disease and suggestions how to guard against it. Amongst the latter are contained the injunctions: "Keep your children by themselves as much as possible, do not allow them to visit stuffy moving-picture shows or other places where there may be a large gathering of children. Children should not be kept in the house; they should be out of doors as much as possible and not in active contact with other children of the neighbourhood. Do not take your children with you when you go shopping; do not allow your children to be kissed. Remember that children need fresh air in the summer time, and outdoor life is one of the best ways to avoid disease." The bulletin adds that it is perfectly safe for the children to frequent parks and playgrounds if only two or three of them play together, but that they should not play in large groups and should not come in contact with children from other parts of the city. These measures contain nothing new, but are instructive as being the advice of a public health department in view of an unprecedented outbreak. For the instruction of medical men a number of clinics have been arranged at the various hospitals of the city, in many cases daily demonstrations being given.

IN HONOUR OF VERDUN.

"A Tribute in Honour of France, July 14th, 1916," is a pamphlet describing how France obtained Metz and Verdun, written by Sir Henry Morris, and sold for the benefit of the Red Cross Fund by Messrs. John Bale, Sons, and Danielsson. The pamphlet arose out of a correspondence in the *Times* alluding to the eating of the bodies of the slain during the siege of Breisach in 1638. A quotation was made by a correspondent from "Professor Blackie's Letters," published in 1910, alleging that Metz was stolen from Germany some 200 years ago by Louis XIV. Sir Henry Morris, in a reasoned reply, compares the history of Metz and Breisach and shows that Professor Blackie made a mistake. Further, he gives concisely the early, mediæval, and modern history of Metz, and describes how France obtained Verdun. The statement is often made that in 1552 Metz was treacherously taken possession of by the French, and that although Charles V. besieged it the French kept it till it was ceded to them formally in the year 1648 by the Peace of Westphalia. It is not clear what is meant exactly by the word "treacherously" in this connexion. Our notion of national patriotism has been of gradual growth, and there is no doubt that in the sixteenth and seventeenth centuries

many cities still retained such pride in their own independence and importance that their individual history was altered by their attitude towards their big neighbours. Sir Henry Morris's historical note is most interesting, and will be read by many now that the word Verdun is not only on all our lips but speaks to our warmest feelings.

THE METROPOLITAN WATER-SUPPLY.

DURING the month of May the mean rainfall over the Thames basin was 2·06 inches, which represents 0·10 inch above the average mean rainfall for this month during the previous 33 years. With increased rainfall there is generally shown to be a deterioration in the chemical quality of the raw river waters in some respects. The results of the chemical examination during May showed that the raw Lee water deteriorated as judged by the albuminoid nitrogen, permanganate, and colour tests, but there was no change with regard to its turbidity. The raw Thames and New River supplies similarly deteriorated in quality as judged by the albuminoid nitrogen tests, but improved as regards the permanganate, turbidity, and colour tests. The samples collected at the different works were, generally speaking, clear, bright, and free from suspended matter, the filtered waters in fact showing an improvement in quality during the month as judged by the albuminoid nitrogen, permanganate, and colour tests. All three raw waters contained more bacteria than their respective averages, while the filtered waters, generally speaking, yielded not unsatisfactory results, as will be seen from the following statement. Whereas 78·3, 86·9, and 34·8 per cent. of the samples of raw Thames, Lee, and New River water respectively contained typical B. coli in 1 c.c. (or less) of water, 90·9, 60·9, and 93·9 per cent. of the filter water derived from these supplies (placing them in the same order as above) contained no typical B. coli even in 100 times as much water—namely, 100 c.c.

CHINA AND WESTERN MEDICINE.

NATIVE medical practice in China is still founded on Taoism, which became in the hands of its later interpreters a quest for a kind of philosopher's stone to induce long life. The text-books are those of a thousand years before the Christian era, and nothing of modern application, except perhaps acupuncture, has emerged from them. It now appears that the medicine of the Western world is beginning to take firm root, a fact to which fresh testimony is borne by the holding of the first annual conference of the National Medical Association of China, of which we publish a report in another column. The report is belated, but the postal facilities of the world have been much curtailed of late, and the internal condition of China very disturbed. The free interchange of thought and opinion has largely homogenised thought and practice in this country during the last half century, and international conferences had begun to do the same for Europe before the war broke out; for it had already become possible for a student with a smattering of a foreign tongue to spend with advantage one or more semesters at a university other than his own without finding the medical and surgical practice too foreign for him to assimilate. The foundations of similar things are now being laid in China, and, if recent experience does not mislead, the superstructure is likely to rise rapidly. Dr. Yen, in his presidential address to the association, spoke of some of the public health problems to be faced in China, which are seen to be the same wherever the culture of the occident has penetrated. The consumption of alcohol and of patent medicines seems fated at first to rise as the level of civilisation, in our modern conception of the word, rises. It is discreditable to Western pioneers that this should be so, and we trust that China may find a short way of dealing with the evils. Allusion was made at the conference to many familiar Western problems: it was stated, for instance, that an attempt to train the old-fashioned nurse to become a clean and efficient midwife had failed in China. The institution of a State Medical Service to meet the necessities of public and private practice was proposed, and it is possible that in a country with no old conceptions of medical practice, and no vested interests, as we understand them, the drastic principles of such a service might be adopted with greater ease than they can be in this country.

METROPOLITAN HOSPITAL SUNDAY FUND.

THAT in spite of the heavy demands made on the purses of the charitable in connexion with the war, and in spite of the vast increase in the cost of living, the sum collected by the Metropolitan Hospital Sunday Fund should have fallen short by only £2600 of last year's total is a great satisfaction to the supporters of this valuable charity. The actual sum collected for the current year up to the meeting of the Council on Tuesday last was £68,000, of which £66,430 will be distributed among 248 hospitals, convalescent homes, dispensaries, and nursing institutions, 7½ per cent. of the total being applied to the purchase of surgical appliances. On the motion of Lord Knutsford, the General Purposes Committee were empowered to consider the advisability of having a fixed date for Hospital Sunday during the winter months, on the ground that a better response to the appeal would result at that season of the year.

THE BOARD OF SCIENTIFIC SOCIETIES.

ON the initiative of the Royal Society a Board of Scientific Societies has been established for the furtherance of the following objects: Promoting the coöperation of those interested in pure or applied science; supplying a means by which the scientific opinion of the country may, on matters relating to science, industry, and education, find effective expression; taking such action as may be necessary to promote the application of science to our industries and to the service of the nation; and discussing scientific questions in which international coöperation seems advisable. The Board at present consists of representatives of 27 scientific, including technical, societies. The regulations give power to add to this number and to appoint as members of subcommittees individuals who are not necessarily connected with any of the constituent societies. An executive committee has been appointed consisting of the following members: Sir Joseph Thomson, O.M., P.R.S. (chairman), Dr. Dugald Clerk, F.R.S., Sir Robert Hadfield, F.R.S., Mr. A. D. Hall, F.R.S., Professor Herbert Jackson (honorary secretary), Sir Alfred Keogh, K.C.B., Sir Ray Lankester, K.C.B., F.R.S., Professor A. Schuster, Sec.R.S., Sir John Snell, Professor E. H. Starling, F.R.S., Lord Sydenham, F.R.S., and Mr. R. Threlfall, F.R.S.

THE SHIAH PILGRIMAGE AND THE SANITARY DEFENCES OF MESOPOTAMIA AND THE TURCO-PERSIAN FRONTIER.

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III.[1]—THE SANITARY DEFENCES ON THE TURCO-PERSIAN FRONTIER.

THE total length of the Turco-Persian frontier, from the neighbourhood of Mount Ararat on the north to the Persian Gulf on the south, is approximately 800 miles. The greater part of this line—all, indeed, except a short portion at the southern extremity—passes through highly mountainous country, inhabited by nomadic or semi-nomadic Kurdish and Arab tribes. The mountains rise in many places to 10,000 or 12,000 feet, and are only crossed, at long intervals, by certain more or less well-defined routes of communication between the two countries. In the report of the Commission of Inspection a careful study was made of the principal of these routes, of the various tribes living on or near to the frontier line, of their seasonal migrations, and of the through movement of passengers and pilgrims from one country to the other. Unfortunately, the manuscript of this chapter of the report was not saved with the other papers, and is still in Constantinople, and it cannot be fully reconstructed here. The following statements may, however, be made.

Firstly, as regards the northern third of the frontier, from Ararat southwards to Shemdinan, the sanitary defences were dealt with by the earlier Commission, that of July, 1911, already mentioned in the first of these articles. That Commission found that the sole lazaret in this region, that of Kizil-Dizé near to Bayazid, was in a deplorable condition, and recommended the construction of a proper sanitary station there and of four secondary stations elsewhere.

In the southern two-thirds of the frontier, apart from the many minor routes of communication already referred to, there is but one great line of through traffic—that which passes from Kermanshah in Persia, through Kasr-i-Shirin to Khanikin, on the Turkish side of the frontier, and thence, through Kizil Robat, Shahraban, and Bakuba, to Bagdad. As compared with this line, all other routes are of minor significance. Along many of them, no doubt, there is a considerable amount of movement of passengers and goods, but it is mainly of a local character, and the quantity of what may be called long-distance through traffic by these routes is apparently very small indeed. In this local movement are included the seasonal migrations of the Kurdish or other tribes already alluded to. Practically the entirety of the Shiah pilgrim traffic, from Persia to the holy places of Mesopotamia, passes by the Khanikin route.

Along this part of the frontier the only existing sanitary defence consists of a lazaret at Khanikin and of health offices at Rayet, Suleimanieh, and Mendeli; an office formerly existing at Revanduz was done away with a few years ago. The personnel of these offices consisted solely of sanitary clerks, and sanitary guards mounted or on foot, whose main duty it was to collect the sanitary tax of 10 piastres[2] (about 1*s.* 8*d.*) on all persons, and of 50 piastres on all dead bodies entering Turkey from Persia, and of endeavouring to prevent "contraband" in dead bodies—a subject to be dealt with later. Scanty as these sanitary defences may seem for for such an immense length of frontier, the Commission did not propose to create any new lazarets or sanitary stations, save at Mendeli, near the southern end of the line, where there is a considerable through movement of both persons and dead bodies, and where it was proposed to create a small observation and disinfection station.

It was not recommended to establish new stations at other points, as it was held that, on the one hand, the danger to public health offered by the small amount of through traffic along the various minor routes was not very great, and that, on the other, any attempt to subject to proper sanitary control the unruly tribes in their seasonal migrations was foredoomed to failure, while the practical obstacles in the way of establishing sanitary stations in these remote and mountainous districts would have been exceedingly difficult to overcome.

Many of the names mentioned above have recently become familiar to the general public, and will become still more so as the war progresses. The arrival of Russian forces at Revanduz was announced some time ago; the Russo-Turkish battle line has recently swayed between Kermanshah and Khanikin; and we all hope to see the Russian army descend from Khanikin to Bagdad by the route already mentioned. That route is, and has been in the past, one of the principal lines of military invasion, and in like manner it has been the most frequent route by which epidemic disease has passed from Persia to Turkey, or from Turkey to Persia. The Khanikin lazaret has been Turkey's sole defence against the former danger; Persia, on the other hand, has had no lazaret upon her side of the frontier, though of recent years she has projected the construction of one at or near to Kasr-i-Shirin. Disease has as frequently passed in one direction as in the other, as will be seen from the following brief summary of the history of cholera and plague in the frontier region.

The Frontier as a Channel of Importation of Disease.

In the first great pandemic of *cholera*, that of 1819–22, the disease was imported to the Tigris valley, and in the autumn of 1821 passed into Persia, as the result of a war between Turkey and Persia. In 1851 cholera was imported from Bagdad to Suleimanieh and Revanduz on the frontier, and in the following year was epidemic on both sides of the frontier line. In 1856 the disease was epidemic in Persia; from Kermanshah it spread to Khanikin, where, as also on the road between Khanikin and Bagdad, the pilgrims suffered terribly, and later they carried the infection to Bagdad, Kerbela, and the Euphrates valley. Cholera followed a similar route in 1860. In 1861 it was imported from Persia to Mendeli and Bakuba, and thence to Bagdad, Kerbela, and Nejef. In 1865 it appears to have crossed the frontier from Turkey into Persia, near Suleimanieh. In 1867–69 the disease was epidemic in Persia, and is said to have crossed the frontier into Turkey from Kermanshah. In 1893 cholera appeared in Mendeli and in Khanikin, and as it was already epidemic in Persia it was probably imported from there. In 1904 the epidemic, whose course from Syria to Mesopotamia in 1903 was traced in the preceding article, was apparently introduced into Persia from Turkey and caused an excessively severe and fatal epidemic there. In subsequent years cholera was frequently epidemic in Russia and occasionally spread thence into Persia and Turkey in Asia; and in 1910 it once more passed down from Kermanshah, through Khanikin, to Bagdad.

During the latter half of last century *plague* was, as stated in the preceding article, endemic and sometimes epidemic, at places in the Euphrates valley and on both sides of the Turco-Persian frontier. On the Turkish side the principal outbreaks occurred in the Hindieh marshes, along the lower Euphrates, about Djaara and Shenafieh, in Nejef, in Bagdad, at Bedra, Zorbatia and Mendeli near the southern end of the frontier, and among the Muntefik tribes. On the Persian side there were outbreaks of the disease at Maku, near Lake Urumiah, in and near Hamadan, at Saouj-Boulak, Jivanrao, Merivan, Uzunderé, Mahideshté, and other places along the frontier line. The important fact to notice, however, is that, while the infection was occasionally carried from one side of the frontier to the other, the result was always confined to a localised epidemic, and the disease has shown no tendency to spread from the centres named to other parts of the world.

The Khanikin Lazaret.

The utility and necessity of this institution will readily be realised from what was said above as to the overwhelming importance of the Khanikin-Bagdad route, as compared with all others that cross the frontier. This necessity will become still greater in future if the various schemes put forward for railway development in Turkey and Persia are realised. Of these the most important in the present connexion will be the proposed extension of the Bagdad Railway to Khanikin and Kermanshah. This will start from the main line not at Bagdad, but at Sumeikha, 60 kilometres north of Bagdad. It will cross the Tigris and ultimately join the usual caravan route at Kizil Robat, whence it will pass to Khanikin and Kermanshah. Meissner Pasha, the chief engineer of the

[1] Parts I. and II. were published in THE LANCET of August 12th, p. 289.

[2] A Turkish piastre is of the value of 2*d.*

Bagdad Railway (and formerly of the Hedjaz Railway), informed me that this line is planned to pass quite close to—within 300 metres of—the present lazaret at Khanikin; there will, therefore, be no need to transfer the lazaret from its present admirable site.

Other projected railways are destined to increase still further the importance of the Khanikin lazaret. The principal of these will be the line, already partly opened, connecting Julfa on the Russo-Persian frontier, the terminus of the Tiflis-Julfa railway, with Tabriz, Hamadan, and Kermanshah. The opening of these new railways will certainly increase very considerably the number of Shiah pilgrims coming from Persia, the Caucasus, and Central Asia to the Shiah holy cities of Mesopotamia. This expectation is based on many precedents. Thus among the many striking effects of the opening of the Trans-Siberian Railway at the end of last century was a very marked increase in the number of pilgrims to Meshed, in northern Persia, close to the Russian frontier. There is a famous Shiah shrine here, over the tomb of Imam Riza, which has always attracted many pilgrims, and which will be referred to again in the following article. Notices in the local languages were hung in the principal stations of the then new railway, and special reduced fares were offered to Shiah pilgrims, with the result just stated. So, too, the opening of the Hedjaz Railway, which was completed as far as Medina in 1908, has led to a large increase in the number of pilgrims travelling from Damascus to Medina. Other examples of a like nature could be quoted from India and elsewhere.

But the opening of the new and projected railways in Persia and Mesopotamia may be confidently expected to increase not only the number of Shiah pilgrims to Kerbela and Nejef, but also the number of Moslem pilgrims proceeding to Mecca and Medina, in spite of the distances involved. For with the opening of these new lines such pilgrims will be able to travel by rail from their homes in these Asiatic provinces direct to Medina. A glance at the map will show that they could take train by the new Persian railways to Kermanshah, thence by the Bagdad extension line to Bagdad, and thence by the main Bagdad line to Aleppo. From there a line connects, through Homs and Hama, with Damascus, and from Damascus the Hedjaz Railway runs for 800 miles, through "the desert and the sown," to Medina, and may ultimately be extended to Mecca. The great importance of these railways from a public health point of view, and the increased danger of the spread of epidemic disease by their means are obvious, more particularly as the majority of passengers will be pilgrims, a class by whom disease has so often been spread in the past, and for whom specially strict measures are always required under the International Sanitary Conventions.

Some idea of the number and nationality of persons passing through the Khanikin lazaret may be gathered from Table I.

TABLE I.

Year.	Persians.		Russians.		Turkish.		Indians.		British.		Barbaris.		Afghans.		Total.	
	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1909–10	21,023	1591	1726	188	352	14	9	2	—	—	—	—	182	67	26,460	1862
1910–11	42,808	4941	1762	193	3659	27	6	4	—	—	—	—	129	66	48,364	5231
1911–12	20,450	2173	896	90	2887	4	—	3	—	—	388	131	61	6	24,682	2407
1912–13	26,967	6613	1111	125	1428	10	2	—	3	—	—	—	43	3	29,564	6751

P = paying; N = non-paying. The "non-paying" include children under seven and persons pleading indigence, who were exempted from the sanitary dues.

These figures, however, can only be regarded as approximately correct. Many pilgrims and passengers, it is believed, escape registration; and the nationality of those registered is often very imperfectly ascertained. Thus the numbers of "Persians" should probably be less than appears in the table, and those of "Russians" greater, since there appears to have been a tendency to register all persons coming across the frontier as "Persians."

In addition to passengers and pilgrims, a large number of dead bodies, on their way to the holy burying grounds of Kerbela and Nejef, annually pass through the Khanikin lazaret. The number and nationality of these bodies during the years 1909–14 are shown in Tables II. and III.:—

TABLE II.—*Number of Dead Bodies Arriving at Khanikin.*

Year.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Totals.
1909–10	15	17	18	8	20	43	436	414	1938	585	29	49	3572
1910–11	28	77	137	83	130	582	600	1043	2139	108	20	35	4982
1911–12	6	56	75	16	88	338	148	450	896	245	77	4	2398
1912–13	54	9	22	26	18	179	229	1939	1749	248	23	3	4499
1913–14	16	3	10	19	56	164	98	1532	1724	371	39	19	4051
Averages ...	24	32	52	30	63	261	302	1076	1689	311	38	22	3900

TABLE III.—*Nationality of Bodies Arriving at Khanikin.*

Year.	Afghans.	Russian.	Persian.	Turkish.	Totals.
1909–10 ...	7	1084	2468	13	3572
1910–11 ...	4	930	4024	24	4982
1911–12 ...	3	487	1908	—	2398
1912–13 ...	—	1258	3241	—	4499
1913–14 ...	—	1234	2817	—	4051
Averages ...	2·8	998·6	2891·6	7·4	3900·4

From these tables it will be seen that an average of 34,000 travellers and 3900 corpses pass through Khanikin every year. The monthly table shows also that the movement of dead bodies—and the same is true of living persons—is at its highest in the months from August to December and at its lowest from January to July. This seasonal variation will be referred to again in a later article, dealing with the Shiah pilgrimage.

Hitherto the sanitary office and the lazaret at Khanikin have been two separate establishments, situated at some distance from each other. Pilgrims and passengers, with their pack animals, flocks, and dead bodies, were directed to the former when there was no epidemic disease in Persia, and to the latter when there was. The "office" consisted of a large caravanserai, of the usual type found in these regions—that is to say, of a series of arched recesses and enclosed chambers, built round the sides of a large square enclosure. It was here that the sanitary taxes were collected and the dead bodies inspected. It should be explained that for many years past no dead bodies were admitted to Turkish territory if death had not occurred at least three years before and the bodies been reduced to the skeleton state (*en état d'ossements*). Attempts at contraband—to be discussed more fully in a later article—have, however, always been frequent, in order to avoid the payment of the sanitary dues. When detected at Khanikin, the bodies were confiscated and kept in a special depôt prepared for the purpose until claimed by the relatives or bearers, when they were delivered up on payment of the dues. All bodies found to have been buried less than three years ("fresh" bodies) were seized and buried in a cemetery situated some 200 metres from the office. The Commission proposed to do away with this sanitary "office" altogether, and to concentrate the entire sanitary service in the reorganised lazaret. An annual rental of P.20,000 (£166) would thus have been saved to the Turkish Government.

No attempt will be made here to give a detailed description of the Khanikin lazaret as the Commission found it. It occupied an excellent site, a short distance from the eastern side of the town and close to the road or track coming from the Persian frontier. The site measured 530 metres in length and 160 metres in width, making a total area of 84,800 square metres. It had once been surrounded by a wall, but nearly all traces of this had disappeared. On this vast site there were only two buildings. The one consisted of a large porch with two wings containing a series of rooms, built some 40 or more years ago by the greatest Turkish statesman of modern times, Midhat Pasha, when he was Vali of Bagdad. It was extremely solidly built, and, though in a bad state of repair, it was proposed to consolidate it and incorporate it in the plan of the new lazaret. The other building was a disinfecting pavilion. Though constructed comparatively recently, it had been so badly planned and built of such inferior material that the Commission saw no other course open but to recommend its demolition and the construction

of a larger and better pavilion on another portion of the site.

Complete plans and estimates for a practically new lazaret were prepared, from the Commission's indications, by a French architect, who accompanied the Commission from Bagdad to Khanikin. These are, of course, omitted here. The plan comprised, firstly, a large enclosure, where the collection of dues and "revision" of corpses would take place, whether plague or cholera was or was not epidemic in Persia at the time. In ordinary times the passengers would not go farther than this enclosure, but if plague or cholera were present in Persia they would pass to the disinfecting pavilion, to be erected in an adjoining enclosure. The rest of the site would have been occupied by a series of "cordons," by hospitals for infectious and non-infectious cases, by houses for the lodging of better-class passengers, by residences for the doctors and staff, and by the various other accessories of a properly organised sanitary station.

Land quarantines have, of course, been long since condemned by the International Sanitary Conferences, and this station was intended to be occupied solely by groups of passengers among whom a case of cholera or plague had actually occurred. Certain special conditions obtaining at this land frontier had to be taken into consideration and provided for in the plan of the lazaret. Thus the greater number of the groups of travellers arriving at Khanikin are accompanied by many animals—such as horses, donkeys, camels, and others. It would be practically impossible to separate them from these animals. Any attempt to do so would lead to extreme confusion and acute quarrelling as to the ownership of the respective animals, and a special staff would be required for feeding and watering the latter if they were quartered apart from their owners. Consequently both in the enclosure for the "revision" of bodies and in each "cordon" it was proposed to have long "hangars," 10 metres wide, and other special arrangements for the accommodation of the animals. It was freely admitted that such an arrangement is very far from ideal, but it was realised that, apart from the practical difficulties in the way of separating the animals from their owners, an attempt to do so would probably lead to the open revolt of the latter, thus rendering impossible the application of further sanitary measures.

FIG. 3.

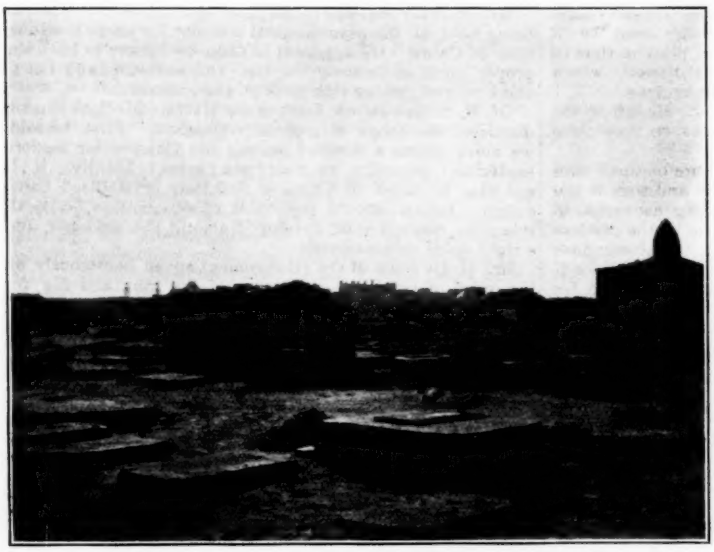
Shiah corpses approaching Nejef.

A few words may be said as to the systems of water-supply and of excreta disposal which it was proposed to adopt in the new lazaret. The water would continue to be taken, as in the past, from a small stream, known as the Hadji Kara Sou, which flows near the west side of the lazaret site, at a distance varying from 30 to 90 metres. This stream rises in the river El Wend, upon which the town of Khanikin is built, at a point well above the town, and at a distance of about six kilometres from the lazaret. The El Wend is a branch of the Diala river, which, again, is a branch of the Tigris, into which it flows a few miles south of Bagdad. The water of the Hadji Kara Sou is of the usual impure character found in these regions, and arrangements for its purification before distribution similar to those proposed for the Basra lazaret, and briefly described in the preceding article, were also proposed for this lazaret.

As at Basra, it was recommended to have a series of trough closets in all parts of the lazaret, with automatic flushing tanks and drains leading to "*fosses à fond perdu*." These would be placed well outside the lazaret enclosure, and on the opposite side from the source of the water-supply. The soil here is composed of sand and gravel, and would, it was thought, lend itself to this system of excreta disposal. It was intended to construct without delay the greater part of the new buildings provided for in the plan, while leaving space for certain additional "cordons" and buildings to be put up if, after the opening of the new railways, additional accommodation for pilgrims and passengers were found to be necessary. The estimated cost of the works to be put in hand at once was 17,000 Turkish liras (or £15,300 sterling), and that of the additional works about £T.2000, making a total estimate of £T.19,000 (or £17,100 sterling). These sums would have been taken from the £T.280,000 which, as explained in the opening article, had been voted for the reorganisation of all the Turkish lazarets.

(To be continued.)

FIG. 4.



In the Cemetery of Nejef.

NATIONAL MEDICAL ASSOCIATION OF CHINA.

THE FIRST ANNUAL CONFERENCE AT SHANGHAI.

THAT Western medicine is making rapid headway in the ancient land of China is shown by the following account of the first conference of the National Medical Association of China which was held in Shanghai last February. It may interest our readers to learn that the secretary (now President) and moving spirit of that Association is Wu Lien Teh, M.D. Cantab., well known to many English friends as Dr. G. L. Tuck. The international postal difficulties existent just now, as well as the political unrest of China, are illustrated by the fact that the report of the meeting has reached us so late.

The following were the original officers of the Association: F. C. Yen, M.D., D.T.M., President; Wu Lien Teh, M.A., M.D., secretary; E. S. Tyau, M.D., D.P.H., treasurer. Way Sung-new, A.B., M.D., was the secretary of the conference, and Dr. T. K. M. Siao and Dr. J. H. Liu were the associate secretaries.

MONDAY, FEB. 7TH.

The first day's session was held in the Martyrs' Memorial Hall, Shanghai. There was an attendance of 55, a considerable number of the delegates being from other cities.

Dr. YEN, in his presidential address, after welcoming the members present, and expressing gratification that the attendance was sufficiently large to insure the success of this the first annual conference of the Association, dealt with various matters connected with the work of the Association, and urged that all should work as a united body for the best interests and welfare of the medical profession. He advised that their efforts be concentrated on a few undertakings which can best be done by Chinese, or on work which foreigners were prevented from doing. Their own time could be better spent in spreading medical knowledge than in research. It was more important for them to translate medical books than to write articles for foreign medical journals.

Dr. IDA KAHN (Nanchang) read an instructive paper on Hygiene in the Home. Beginning with the choosing of the site of the house, the lecturer went on to consider its construction, furnishing and equipment from a sanitary standpoint, and its sanitation, concluding by showing the adaptation of these things to family life and duties.

Dr. WU LIEN TEH (Harbin) followed with a paper on the Foundations of Modern Hygiene in China. He stated that regulations for the preservation of good health were published in China as far back as B.C. 700. Nevertheless, for many centuries the adoption of progressive ideas to cope with existing problems had not made enough headway, a fact which was especially noticeable at the present time in the matter of the prevention of infectious disease, which might be regarded as the essence of modern hygiene.

Dr. W. W. PETER, of the Council on Public Health of the China Medical Missionary Association, spoke on Preventive Medicine, discussing the paper read.

In the evening Dr. YEN gave a public lecture on the Duties of the Medical Profession, first to the public and then to the profession itself. He spoke of the appalling consumption of alcohol and tobacco, the spread of disease by the careless use of common towels and eating utensils, the tremendous death-roll, and the folly and extravagance of parents spending $2000 in two months for worthless Chinese medicine for an infant whose life would have been saved had a physician been called. The lecturer devoted considerable time to an exposure of the worthlessness and harmfulness of the varieties of patent medicines that are being shipped to China by the ton. Chinese dispensaries all over China are largely stocked with these imported articles; and even Chinese drug-dealers themselves, instead of devoting their energies to manufacturing pure drugs, are from year to year increasing their output of Chinese-made patent medicines. Some of the large shops in Shanghai handle scores of these "medicines," the claim being made for one medicine that it was able to grow a new foot to replace one that had been injured in infancy.

TUESDAY, FEB. 8TH.

Dr. LUJIEN TSAO (Nanking) read a paper on Medical Education of Nurses. She outlined the history of nursing in China, and mentioned the frequency of meeting nurses who were uneducated and even illiterate, who did not know how to count the pulse, and who distinguished medicines by the colour of the ingredients. But these days, she said, were passing, a new generation of nurses having come into being, the great incentive for this lying in the training of a better class of women, who often belong to the best families. She detailed two important spheres of work for nurses—namely: (1) in social service, where they could teach the people the application of modern hygiene to householders; and (2) in the promising work of midwifery. In regard to the latter, she regretted to say that an attempt to train the old-fashioned ignorant nurses in modern cleanly ways had failed, and she came to the conclusion that midwives must be trained from the beginning; if in America 20,060 women died yearly from the effects of child-bearing, the number must be very much larger in China.

In the absence of Dr. S. P. CHEN (Peking), superintendent of the Peking Isolation Hospital, a paper in his name was read by Dr. ABEL TANG. Dr. Chen classified the medical schools of China into those founded by the Government and those founded by missionary societies. He supported the proposal to have a uniform system of nomenclature in Chinese. In the meantime the English language should be used, but German should not be discouraged. A general examination should first be passed, and he proposed the following measures: (1) Establishment of a Central Board of Control; (2) reorganisation of existing schools; (3) well-equipped hospitals; and (4) provision for post-graduate study.

Dr. J. W. H. CHUN (Harbin) sent a paper on Medical Education, which was read by Dr. E. B. YOUNG (Changsha). He gave the latest obtainable list of medical colleges, and referred to the scheme of the Rockefeller Foundation, by which the education of medical students and nurses would be improved.

Dr. J. H. LIU (Shanghai) read a paper on the same subject, in which he discussed whether the Chinese Government and people should go ahead independently of the foreign institutions. However extensive the schemes of the Rockefeller Foundation may be, he insisted that the Chinese must do things for themselves. He proposed that the conference should pass a resolution to the Board of Education urging the Government to improve the state of medical education in the country.

The foregoing papers were discussed by several foreign doctors who have devoted years of work in China to teaching Chinese students, and who took occasion to express the pleasure they felt at seeing so many men, once their pupils, now qualified physicians.

Mr. C. J. DAVENPORT (Shanghai) said this conference was being held at the psychological moment for medical education in China. He appealed to Chinese doctors to have the proper spirit in treating the sick and suffering, and not to think only of getting rich through the profession.

Dr. H. S. HOUGHTON, Dean of the Harvard Medical School, discussed the scope of medical education. First, he said, we must create a demand among the Chinese for modern medicine. Secondly, we must train nurses. Thirdly, it is not wise to adopt in China a definitely crystallised curriculum. Rather should the habit of observation, critical, scientific reasoning be developed among the students, and a right spirit be conserved.

Mr. D. DUNCAN MAIN (Hangchow) spoke humorously on the need of providing physicians of the rank and file for dealing with disease in China.

Mr. J. G. CORMACK, Principal of the Union Medical College, Peking, was pleased to hear from the Chinese speakers that they would try to develop medical science themselves and not depend entirely on the assistance of foreigners.

Dr. MARY FULTON, for a long time Principal of the Hackett Medical College for Women in Canton, and the first person to train lady doctors in China, emphasised the need of a Central Medical Board before which all practitioners should appear.

Dr. J. B. NEAL, Principal of the Tsinanfu Union Medical College, and Dr. GILLISON (Hangkow) spoke words of congratulation and encouragement to the Association.

In the evening Dr. WU LIEN TEH gave a lecture on How to Live a Healthy Life. A large and appreciative audience was both entertained and instructed during the hour in which Dr. Wu addressed them. As a Shanghai newspaper remarked, if half of his hearers followed Dr. Wu's excellent advice there would be much less work for the doctors.

WEDNESDAY, FEB. 9TH.

The session was opened by Dr. C. VOONPING YUI (Shanghai) with a paper on Medical Text-books and Publications in China. Dr. Yui contended that the Chinese, whether they have been educated in Europe, America, or Japan, should teach medicine in their mother language; he considered that only under exceptional circumstances should new characters be invented, as the Chinese language is already too difficult. In this respect Dr. Yui said that he was not in full agreement with the matured opinion of the China Medical Missionary Association. Nor did he approve of the blind acceptance of Japanese terms by Chinese doctors. Many of the terms depend upon mere tones, and he instanced characters representing typhoid fever, diphtheria, plague, protoplasm, and organic compounds. The difficulties in translation, he said, lay in the great difference between the European and Chinese languages. Most doctors engaged in translation work had to depend upon Chinese literary men, who know no science, or upon scientific men deficient in both Chinese and foreign languages.

Dr. ABEL TANG (Shanghai) also read a paper on Chinese Medical Books and Publications. He regretted that Chinese medical men, unless they are conversant with foreign languages, have to depend upon translations. No time should be lost in producing a Chinese official medical nomenclature.

The general discussion was opened by Dr. NEAL (Tsinanfu), who agreed with the opinion expressed by Dr. Yui and Dr. Tang, and assured his Chinese colleagues that the foreigner's work in China was only temporary; the wish is only to see medical education firmly established.

Dr. LI (Peking), as a graduate from Japan, explained the Japanese reasons for the adoption of their terms. Popular Chinese terms are not accurate enough, and one must be accurate in medicine above all things.

Mr. CORMACK laid stress on simplicity, clearness, and elegance in the adoption of terms. He instanced the word "nerve," which could be translated in Chinese as "brain thread" and not as "brain tendon."

Dr. WANG (Changsha) said that public opinion could not be overlooked, and nothing should be done unless the leaders of education approved. The missionary and national associations should unite with the well-organised Kiangsu Educational Association to come to a decision and petition to Central Government.

Dr. MCALL said that modern medical education may be compared to an infant which must and will grow, and the proper steps should be taken now for its development.

Dr. W. H. VENABLE (Kashing), President of the China Medical Missionary Association, gave a word of welcome to the conference.

In the evening Dr. ARTHUR STANLEY (health officer, Shanghai) gave a most instructive and interesting lecture on Quack Medicines, in the course of which he deplored the fact that many foreign-trained Chinese physicians in Shanghai were working in association with drug stores.

THURSDAY, FEB. 10TH.

The fourth day's session began with a paper by Dr. P. M. JEE (Tientsin), read by Dr. CHOW, on the Standards of Medical Practitioners, in which he dealt with the difficulties attending the determination of a uniform standard for medical practitioners in China. Dr. Jee supported the proposal for the establishment of a Central Medical Board under the auspices of the Peking Government.

Dr. H. T. CHIANG (Tayeh) sent a paper on the Status of Medical Practitioners, which was read by Dr. W. P. CHUNG. In this paper medical practitioners in China were classified as follows: 1. The old-fashioned native physicians, whose only diploma was their signboard. 2. Nurses and assistants who had been trained in mission hospitals. These are a little better than the first group, but some are for making money only and do not work for the benefit of humanity. This class, he said, are often guilty of criminal practices. 3. Graduates from Union Medical Schools are pretty well trained practically, though not well versed in the science of medicine. 4. Graduates from Japan. 5. Doctors properly qualified in the colleges of Europe and America. Dr. Chiang pressed for the early establishment of a Central Medical Board for the registration of all practitioners. He urged the sending abroad of more students for the study of medicine, and said that the government should subsidise the existing medical colleges in this country.

In the discussion on "Medical Standards," Dr. MERRINS (Shanghai) mentioned the ethical standards which should govern conduct of the physician individually, his attitude towards the members of his own profession, and his relations with the State. In view of the ignorance of medical subjects and the poverty of the great mass of the Chinese people, he urged the need of establishing a State Medical Service which would give a settled position to medical men and enable them to exercise government authority in introducing and enforcing measures necessary for the public health.

Dr. VENABLE emphasised the dignity and greatness, together with the humanity and modesty, of the medical profession. He recommended the two grand words, "I serve," as the motto that might be adopted.

Mr. MAIN dwelt on the danger of placing money too much to the fore.

Dr. WU LIEN TEH then read a paper entitled "An Inquiry into Ancient Chinese Ideas of Treating Poisons."

Dr. PETER'S subject in the evening was "Health as a Factor in National Strength," and the points he wished to emphasise were driven home with convincing force by the almost automatic working of many ingenious mechanical demonstrating devices, and by maps and charts. At 8 o'clock there was a lecture by Dr. HOUGHTON on Intestinal Parasites and their Ova, which was illustrated by lantern slides from microphotographic plates.

FRIDAY, FEB. 11TH.

On this, the fifth day of the conference, there was a further discussion on patent medicines in which Dr. YOUNG (Changsha) and Dr. ELI DAY (Shanghai) read short papers urging the members of the association to wage war against patent medicines and quackery.

Dr. STANLEY, who joined in the discussion, said that not only must the doctors fight against unnecessary drugging, but they must themselves refuse to prescribe any but drugs of known value.

The following ten gentlemen were elected the first honorary members of the association: Chou Hsueh-hsi, the Minister of Finance, and Chu Chi-chien, the Minister of the Interior, both of whom have rendered considerable service in promoting medical science in China, particularly in connexion with the proposed new National Hospital at Peking; Dr. Arthur Stanley, health officer of the Shanghai municipal council; Mr. Dugald Christie, Medical College Hospital at Mukden; Mr. Duncan Main, Hangchow; Dr Douglas Gray, physician to the British Legation at Peking; Dr. H S. Houghton, Harvard Medical School, Shanghai; Dr. W. W. Peter, Public Health Council of the China Medical Missionary Association; Dr. E. H. Hume, Hunan-Yale Hospital, Changsha; Dr. G. E. Morrison, adviser to the late President Yuan Shih-kai.

A letter was read from the China Medical Missionary Association inviting the National Association to hold a joint conference with it next year at Canton, which was agreed to.

In the evening Mr ROGERS S. GREENE (the China Medical Board of the Rockefeller Foundation) delivered a very interesting lecture entitled "A Layman's Impressions of Modern Medicine."

SATURDAY, FEB. 12TH.

On this day the conference was brought to a close by the election of officers for the ensuing year and by the passing of various resolutions.

It is interesting to mention that during the conference it was announced that a Chinese National Hospital is to be established in Peking. It will be supported partly by Government and partly by private subscriptions from Chinese, the organisers refusing foreign help. After six years of endeavour by Dr. Wu, a meeting was held at Peking in December last, which was attended by leading officials. Mr. Tsao Ju-lin, Vice-Minister of the Foreign Office, who had worked for the project indefatigably and who presided, emphasised the urgent need of having a model hospital in the capital where all classes of Chinese could be treated in an efficient manner. The existence of

such an institution would not only serve as an object-lesson to the masses regarding the superiority of modern scientific medicine as compared with ancient empirical medicine, but would help in influencing other large cities in China to follow suit. Owing to the strong support of Mr. Chou Hsueh-hsi, who had already promised $100,000 of the $300,000 required, and of the Minister of the Interior, who had offered a large piece of Government land in the west city for the purpose, they could say at last that their long-deferred scheme of a national hospital would soon be realised. Since the conference a contract had been signed for the construction of the hospital, and building is to begin at once. The plans have been drawn by Messrs. Shattuck and Hussey, an American firm of architects. The building will be in three storeys with a basement, and there will be accommodation for 50 first- and second-class patients, and 100 third-class patients Unusual interest has been taken in the hospital throughout the country, and subscriptions have been received from the south, Shanghai, Tientsin, and even Hong-Kong.

The following lectures and demonstrations were also given during the conference: Properties and Uses of Radium, by Mr. Ernest Heezfeld; Life Insurance Examinations, by Dr. T. K. M. Siao; Preservation of Museum Specimens in Liquid Paraffin, by Dr. Liu; and a Hygienic Chair and Table for the Use of School Children, by Dr. Yui.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Treatment of Gunshot Wounds by Carrel's Method.

M. Quénu recently made a report to the Surgical Society on 121 gunshot wounds treated by two Army doctors, MM. Hornus and Perrin, on Carrel's lines. He said that the results obtained bore testimony to the value of the method. Neither prompt treatment, nor perfection of appliances, nor quality of nursing was sufficient in itself to explain the results. The treatment consisted in laying the wounds freely open, removing foreign bodies and free sequestrums, and irrigating the surface with Dakin's liquid. The sterilisation—or at least the chemical lavage—was kept up by constantly renewing the supply of antiseptic fluid to the interior of the wound. When, after a period of days or weeks, the wound was found on bacteriological examination to be nearly or quite sterile, secondary suture of the wound was undertaken, or in cases where loss of substance prevented this a progressive approximation of the edges of the wound by means of a kind of corselet provided with hooks and elastic bands. MM. Hornus and Perrin had treated by this method 81 wounds of soft parts, 21 wounds with bony lesions, 7 with injury of both bone and joints, 6 wounds of joints without fracture, 3 wounds of the chest, and 3 burns. M. Tuffier communicated to the society at the same session the good results obtained by MM. Dehelly and Dumas by following Carrel. The 19 cases in which the method had been employed demonstrated the great probability of obtaining healing by first intention after secondary closing of gunshot wounds. The disinfection of severely contaminated wounds was shown to be harmless and efficacious. After M. Pozzi and Dr. J. L. Faure had noted with satisfaction the revulsion of feeling in favour of Carrel's method, MM. Routier and Hartmann stated their conviction that if all the details of the application had been known at first as they were now no objection would ever have been raised to the method.

Treatment of Contractures of the Jaws.

M. L. Imbert, head of the medical service especially concerned with the plastic surgery of the face, has with the help of M. Réal studied a large number of cases of contracture of the jaws. They distinguish three forms—bony, cicatricial, and sclerosing; while four-fifths of the cases at present belong to yet another form, hypertonicity of the masseters, not mentioned in the text-books. To overcome these contractures it is necessary to combine mecanico-therapeutic movements produced by means of a gag with continuous dilatation of the jaws directed against the tonic resistance of the masseters. Surprising results have thus been obtained.

The Removal of Projectiles from Wounds.

MM. Chauvel and Sauvé have both made recent contributions on this subject. M. Chauvel has described the successful extraction of 250 projectiles with intermittent control by the X-ray screen. He does not advise the removal of all foreign bodies, but those should be extracted which keep up suppuration or functional impairment or which from their position may injure a neighbouring nerve or vessel. Projectiles encysted in muscle, peritoneal cavity, or the interior of any viscus should be removed at the instance of the patient. M. Chauvel hesitates to touch projectiles situated in the lung near to the hilus, in the liver, or in the mediastinum, when intervention is a grave matter in its immediate or remote results, and also such as are encysted in bone or callus and well tolerated there, removal in such cases often leaving troublesome fistulas. M. Sauvé reported to the Society of Surgery on foreign bodies extracted under three different conditions. In the first, he operated after localisation by a radiologist in his absence with fair results: 29 successes, 18 failures (35 per cent.). In the second, the extraction was undertaken after marking out the position of the projectiles with the radiologist. The results were better: 124 successes, 9 failures (7 per cent.). In the third, when he operated with intermittent control by the X ray screen, M. Sauvé extracted 108 projectiles in 110 cases. The two failures could not be put down to the method. In each case the foreign body was intrapulmonary. One patient had an attack of syncope when the pleura was opened, and the operation was therefore abandoned. In the other case a piece of shrapnel was found embedded in the body of a vertebra and it was decided to leave it there. The question of intra-osseous and periarticular bodies is of special importance. It is admitted that those lying within the joints cause serious impairment of function and should be removed. Discussion has centred round those situated within the bone. In general, projectiles in the diaphysis are well borne if there is no septic reaction. This is not the case with those lying in the epiphyses which often give rise to grave impairment of movement. M. Sauvé counsels their removal.

August 8th.

THE BELGIAN DOCTORS' AND PHARMACISTS' RELIEF FUND.

THE EXECUTIVE COMMITTEE.

A MEETING of the Executive Committee was held on August 9th. Since the last committee meeting on June 8th the books of the society have been audited by Messrs. Crewdson, Youatt, and Howard, and the following cash statement issued:—

Cash Account from Dec. 1st, 1915, to June 30th, 1916.

Receipts.	£	s.	d.	*Payments.*	£	s.	d.
Dec. 1st, 1915—				June 30th, 1916—			
To balance as per last account ...	15,608	12	0	By relief	2,562	11	10
				,, clothes ...	57	0	10
				,, administration expenses ...	12	9	3
					2,632	1	11
June 30th, 1916—							
Donations	305	8	5				
Interest received	528	3	10	Balance at bank, £1,945 12 3			
				Treasury Bills at cost, £11,864 10 1	13,810	2	4
Total	£16,442	4	3	Total	£16,442	4	3

The donations lately have been few and trifling, apart from a (second) generous gift of £100 from the Society of Apothecaries. The total sum now received, including donations, interest on deposit, and interest on Treasury bills, amounts to £19,508 13*s.* 2*d.* £800 a month continues to be sent to Belgium, four such amounts having already gone, and receipts received for three. The receipt for the fourth sum has not yet arrived—there is always a certain amount of delay in these documents. The expenditure in other directions has been low, only £44 2*s.* being spent on relief, £20 7*s.* 4*d.* on clothes, and £7 6*s.* on the repairing of instruments.

VITAL STATISTICS.

VITAL STATISTICS OF LONDON DURING JULY, 1916.

IN the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases, it appears that the number of persons reported to be suffering from one or other of the 10 diseases specified in the table was equal to an annual rate of 4·9 per 1000 of the civil population, estimated at 4,310,030 persons; in the three preceding months the rates had been 5·3, 4·7, and 4·8 per 1000 respectively. The lowest rates during the month were recorded in Kensington, Chelsea, the City of Westminster, Hampstead, the City of London, Battersea, and Wandsworth; and the highest rates in Shoreditch, Bethnal Green, Stepney, Poplar, and Greenwich. The prevalence of scarlet fever was slightly more marked than it had been in either of the two preceding months; this disease was proportionally most prevalent last month in Hammersmith, Shoreditch, Bethnal Green, Stepney, and Deptford. The Metropolitan Asylums Hospitals contained 1201 scarlet fever patients at the end of last month, against 1608, 1325, and 1256 at the end of the three preceding months; the weekly admissions averaged 163, against 190, 155, and 159 in the three preceding months. Diphtheria also was rather more prevalent than it had been in other recent months; the greatest proportional prevalence of this disease was recorded in St. Pancras, Stoke Newington, Holborn, Finsbury, Bethnal Green, Stepney, and Greenwich. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals, which had been 1331, 1242, and 1313 at the end of the three preceding months, had declined to 1280 at the end of last month; the weekly admissions averaged 153, against 152 in each of the two preceding months. The prevalence of enteric fever showed but little variation from that recorded in the previous months; of the 37 cases notified during July, 7 belonged to Wandsworth, and 3 each to Paddington, Islington, Stepney, and Bermondsey. There were 40 enteric fever patients under treatment in the Metropolitan Asylums Hospitals at the end of last month, against 39, 30, and 44 at the end of the three preceding months; the weekly admissions averaged 5, against 7, 5, and 7 in the three preceding months. Erysipelas was proportionally most prevalent in St. Marylebone, Hackney, Finsbury, Shoreditch, Bethnal Green, Stepney, Poplar, Bermondsey, and Deptford. The 13 cases of puerperal fever notified during the month included 2 in St. Pancras, 2 in Southwark, and 2 in Camberwell. The 23 cases of cerebro-spinal meningitis included 3 in Islington, 3 in Poplar, 3 in Southwark, and 2 each in St. Pancras, Bethnal Green, Stepney, Lambeth, and Battersea. Of the 18 cases of poliomyelitis 8 belonged to Hackney, 5 to Poplar, and 2 to Islington.

The mortality statistics in the table relate to the deaths of persons actually belonging to the several metropolitan boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased persons had previously resided. During the four weeks ending July 29th the deaths of 3545 London residents were registered, equal to an annual rate of 10·7 per 1000; in the three preceding months the rates were 17·2, 12·9, and 11·5 per 1000. The death-rates last month ranged from 7·7 in Wandsworth, 8·6 in Hampstead, 9·2 in Kensington and in Greenwich, 9·3 in Lewisham, and 9·5 in Stoke Newington, to 12·5 in Shoreditch, 12·6 in Bermondsey, 12·7 in Southwark, 13·0 in Poplar, 14·2 in Finsbury, and 14·8 in Holborn. The 3545 deaths from all causes included 220 which were referred to the principal infectious diseases; of these, 61 resulted from measles, 14 from scarlet fever, 47 from diphtheria, 31 from whooping-cough, 4 from enteric fever, and 63 from diarrhœa and enteritis among children under 2 years of age. No death from any of these diseases was recorded last month in the City of London; among the Metropolitan boroughs they caused the lowest death-rates in the City of Westminster, Hampstead, and Woolwich; and the highest rates in Holborn, Finsbury, Poplar, Southwark, and Deptford. The 61 deaths

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING JULY, 1916.

(*Specially compiled for* THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1915.	NOTIFIED CASES OF INFECTIOUS DISEASE.												DEATHS FROM PRINCIPAL INFECTIOUS DISEASES.									Deaths from all causes.	Death-rate per 1000 living.
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhœa and enteritis (under 2 years).	Total.	Annual rate per 1000 persons living.		
LONDON	4,310,030	—	663	630	—	37	2	13	225	23	18	1611	4·9	—	61	14	47	31	4	63	220	0·7	3545	10·7
West Districts.																								
Paddington	131,397	—	15	15	—	3	—	1	4	—	—	38	3·8	—	—	—	1	—	—	3	4	0·4	99	9·8
Kensington	155,795	—	15	13	—	2	—	—	5	—	—	35	2·9	—	2	1	1	1	—	1	6	0·5	110	9·2
Hammersmith	118,559	—	27	13	—	—	—	—	6	—	—	46	5·1	—	1	—	2	2	—	—	5	0·5	98	10·8
Fulham	151,161	—	23	18	—	2	—	—	3	—	—	46	4·0	—	3	—	—	3	—	3	9	0·8	122	10·5
Chelsea	58,421	—	6	3	—	—	—	—	1	—	—	10	2·2	—	—	—	1	—	—	1	2	0·4	48	10·7
City of Westminster	135,104	—	15	8	—	1	—	—	4	—	—	28	2·7	—	—	—	1	—	—	1	2	0·2	100	9·6
North Districts.																								
St. Marylebone	100,260	—	12	12	—	—	—	—	9	—	—	33	4·3	—	—	—	—	1	—	3	4	0·5	79	10·3
Hampstead	81,760	—	3	11	—	1	—	1	4	—	—	20	3·2	—	—	—	1	1	—	—	2	0·3	54	8·6
St. Pancras	200,322	—	20	40	—	—	—	2	7	2	—	71	4·6	—	1	—	—	4	—	1	6	0·4	183	11·9
Islington	316,242	—	46	59	—	3	—	1	10	3	2	124	5·1	—	3	1	6	3	—	7	20	0·8	282	11·6
Stoke Newington	50,527	—	7	11	—	—	—	—	1	—	—	19	4·9	—	—	1	—	1	—	—	2	0·5	37	9·5
Hackney	217,883	—	41	26	—	2	—	—	18	1	8	96	5·7	—	2	1	3	2	—	4	12	0·7	174	10·4
Central Districts.																								
Holborn	40,405	—	4	9	—	1	—	—	2	—	—	16	5·2	—	—	1	1	—	—	2	4	1·3	46	14·8
Finsbury	76,915	—	11	16	—	—	—	—	6	1	—	34	5·8	—	—	—	3	—	—	3	6	1·0	84	14·2
City of London	19,461	—	3	—	—	—	—	—	—	—	—	3	2·0	—	—	—	—	—	—	—	—	—	17	11·4
East Districts.																								
Shoreditch	103,627	—	25	18	—	—	1	1	9	1	—	55	6·9	—	4	1	1	—	—	1	7	0·9	99	12·5
Bethnal Green	120,207	—	34	26	—	1	—	—	12	2	1	76	8·2	—	2	1	1	1	—	3	8	0·9	106	11·5
Stepney	265,731	—	72	65	—	3	—	—	28	2	1	171	8·4	—	6	—	3	2	1	5	17	0·8	212	10·4
Poplar	156,247	—	25	30	—	—	—	—	12	3	5	75	6·3	—	5	2	3	3	1	2	16	1·3	156	13·0
South Districts.																								
Southwark	179,424	—	17	24	—	1	—	2	10	3	—	57	4·1	—	12	—	2	1	—	4	19	1·4	175	12·7
Bermondsey	117,188	—	21	20	—	3	—	—	9	—	—	53	5·9	—	2	—	2	—	—	—	4	0·4	113	12·6
Lambeth	284,188	—	47	29	—	1	—	—	6	2	1	86	3·9	—	7	2	4	1	—	3	17	0·8	263	12·1
Battersea	161,945	—	16	15	—	—	—	1	9	2	—	43	3·5	—	4	—	1	1	—	2	8	0·6	120	9·7
Wandsworth	312,249	—	36	29	—	7	1	1	9	1	—	84	3·5	—	—	1	3	1	1	2	8	0·3	185	7·7
Camberwell	254,385	—	44	31	—	—	—	2	16	—	—	93	4·8	—	1	1	—	—	—	6	8	0·4	190	9·7
Deptford	110,299	—	23	18	—	—	—	—	9	—	—	50	5·9	—	3	1	2	1	—	2	9	1·1	103	12·2
Greenwich	96,385	—	14	37	—	—	—	—	6	—	—	57	7·7	—	2	—	1	2	1	1	7	0·9	68	9·2
Lewisham	164,438	—	28	18	—	1	—	—	3	—	—	50	4·0	—	1	—	3	—	—	2	6	0·5	117	9·3
Woolwich	129,505	—	13	16	—	1	—	1	7	—	—	38	3·8	—	—	—	1	—	—	1	2	0·2	105	10·6
Port of London	—	—	—	—	—	4	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup.

from measles were 36 fewer than the corrected average number in the corresponding period of the five preceding years; this disease was proportionally most fatal in Shoreditch, Stepney, Poplar, Southwark, Lambeth, Battersea, and Deptford. The 14 fatal cases of scarlet fever were 2 below the corrected average number, and included 2 in Poplar and 2 in Lambeth. The 47 deaths from diphtheria were 11 above the corrected average; the greatest proportional mortality from this disease occurred in Islington, Finsbury, Poplar, Deptford, and Lewisham. The 31 fatal cases of whooping-cough were 25 below the corrected average, and included 4 in St. Pancras, 3 in Islington, 3 in Poplar, and 2 each in Hammersmith, Hackney, Stepney, and Greenwich. The 4 deaths from enteric fever were 6 below the average, and belonged respectively to Stepney, Poplar, Wandsworth, and Greenwich. The 63 deaths from diarrhœa and enteritis among children under 2 years of age were 93 below the corrected average number; this disease was proportionally most fatal in Paddington, St. Marylebone, Holborn, Finsbury, Bethnal Green, Southwark, and Camberwell. In conclusion, it may be stated that the aggregate mortality in London last month from these principal infectious diseases was 41 per cent. below the average.

HEALTH OF ENGLISH TOWNS.

In the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census, 7543 births and 3506 deaths were registered during the week ended Saturday, August 12th. The annual rate of mortality in these towns, which had been 11·1, 10·5, and 10·8 per 1000 in the three preceding weeks, fell in the week under notice to 10·6 per 1000 of their aggregate civil population, estimated at 17,312,295 persons for the year 1915. During the first six weeks of the current quarter the mean annual death-rate in these towns averaged 10·8 per 1000, and coincided with that recorded in London during the same period. Among the several towns the death-rate last week ranged from 4·0 in Swindon, 4·1 in Aberdare, 4·5 in Ilford, 5·6 in Burnley, and 5·8 in Gillingham and in Bath, to 14·5 in Great Yarmouth, 14·6 in Bootle, 15·2 in Middlesbrough, 15·4 in Cambridge, and 16·4 in Huddersfield and in Hull.

The 3506 deaths from all causes were 79 fewer than the number in the previous week, and included 266 which were referred to the principal epidemic diseases, against 221 and 228 in the two preceding weeks. Of these 266 deaths, 127 resulted from infantile diarrhœal diseases, 54 from measles, 38 from diphtheria, 34 from whooping-cough, 9 from scarlet fever, and 4 from enteric fever, but not one from small-pox. The annual death-rate from these diseases were equal to 0·8, against 0·7 per 1000 in each of the two preceding weeks. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had been 46, 72, and 82 in the three preceding weeks, further rose to 127, and included 31 in London, 10 in Liverpool, 6 each in Birmingham and Leeds, and 5 each in West Ham, Nottingham, and Manchester. The deaths referred to measles, which had been 59, 64, and 53 in the three preceding weeks, were 54, of which 15 were registered in London, 6 in Sheffield, 5 in Liverpool, and 4 in Manchester. The fatal cases of diphtheria, which had been 43, 35, and 40 in the three preceding weeks, fell to 38, and included 8 in London and 3 in Manchester. The deaths from whooping-cough, which had been 42, 36, and 25 in the three preceding weeks, rose to 34, of which 7 belonged to London. The deaths attributed to scarlet fever, which had been 17, 9, and 14 in the three preceding weeks, fell to 9, and included 2 in Liverpool. The fatal cases of enteric fever, which had been 5, 5, and 14 in the three preceding weeks, fell to 4, of which 2 were registered in London.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and in the London Fever Hospital, which had been 1216, 1221, and 1173 at the end of the three preceding weeks, further fell to 1107 on Saturday last; 136 new cases were admitted during the week, against 172, 171, and 121 in the three preceding weeks. These hospitals also contained on Saturday last 1269 cases of diphtheria, 178 of measles, 133 of whooping-cough, and 35 of enteric fever, but not one of small-pox. The 878 deaths from all causes in London were 57 below the number registered in the previous week, and corresponded to an annual death-rate of 10·6 per 1000. The deaths referred to diseases of the respiratory system, which had been 99, 90, and 99 in the three preceding weeks, fell to 88 in the week under notice.

Of the 3506 deaths from all causes in the 96 towns, 197 resulted from violence, 351 were the subject of coroners' inquests, and 1080 occurred in public institutions. The causes of 22, or 0·6 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in London and in its 14 suburban districts, in Sheffield, Leeds, Bristol, Bradford, and in 64 other smaller towns. Of the 22 uncertified causes, 6 were registered in Liverpool, 3 in Birmingham, and 2 each in Manchester and Sunderland.

HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns with an aggregate population estimated at 2,372,000 persons at the middle of this year, 1052 births and 554 deaths were registered during the week ended Saturday, August 12th. The annual rate of mortality in these towns, which had been 11·2, 12·5, and 11·2 per 1000 in the three preceding weeks, rose to 12·2 per 1000 in the week under notice. During the first six weeks of the current quarter the mean annual death-rate in these towns averaged 12·0, or 1·2 per 1000 in excess of that recorded in the large English towns. Among the several towns the death-rate last week ranged from 6·1 in Falkirk, 8·6 in Perth, and 9·8 in Kilmarnock, to 14·9 in Motherwell, 16·6 in Kirkcaldy, and 16·8 in Greenock.

The 554 deaths from all causes were 46 in excess of the number in the previous week, and included 46 which were referred to the principal epidemic diseases, against 37 and 36 in the two preceding weeks. Of these 46 deaths, 19 resulted from infantile diarrhœal diseases, 11 from whooping-cough, 8 from measles, 5 from diphtheria, and 3 from scarlet fever, but not one from small-pox or from enteric fever. The annual death-rate from these diseases was equal to 1·0, against 0·8 per 1000 in the large English towns. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had been 7, 15, and 15 in the three preceding weeks, further rose to 19, and comprised 12 in Glasgow, 2 each in Edinburgh, Dundee, and Aberdeen, and 1 in Clydebank. The deaths referred to whooping-cough, which had been 3, 4, and 3 in the three preceding weeks, rose to 11, of which 9 occurred in Glasgow. The fatal cases of measles, which had been 17, 7, and 8 in the three preceding weeks, were again 8 last week, and included 4 in Leith. The 5 deaths attributed to diphtheria, of which 3 were registered in Glasgow, were equal to the average in the earlier weeks of the quarter. The fatal cases of scarlet fever occurred in Glasgow, Motherwell, and Clydebank.

The deaths referred to diseases of the respiratory system, which had been 62, 40, and 58 in the three preceding weeks, rose to 61 last week, and were 5 above the number registered in the corresponding week of last year. The deaths from violence numbered 27, against 32 and 33 in the two preceding weeks.

HEALTH OF IRISH TOWNS.

In the registration area of Dublin 181 births and 126 deaths were registered during the week ended Saturday, August 12th. The annual rate of mortality, which had declined from 18·8 to 14·1 per 1000 in the four preceding weeks, rose to 16·5 in the week under notice, against 10·6 and 11·9 per 1000 in London and Glasgow respectively.

Of the 126 deaths at all ages, 20 related to infants under 1 year, and 34 to persons aged 65 years and upwards. Eleven deaths of infants (under 2 years) were referred to diarrhœal diseases, and 1 fatal case each of enteric fever, scarlet fever, and whooping-cough was registered. Six deaths were the subject of coroners' inquests, and 57, or 45 per cent., of the total deaths occurred in public institutions.

During the same period 166 births and 87 deaths were registered in the city of Belfast. The deaths corresponded to an annual rate of 11·6, or 1·1 per 1000 less than in the previous week, and included 11 of infants under 1 year, and 19 of persons aged 65 years and upwards. Three deaths were referred to infantile diarrhœa, and 1 each to measles and scarlet fever. The cause of 1 death was uncertified, and 5 others were the subject of coroners' inquests, while 26 deaths occurred in public institutions.

THE APPROVED SOCIETIES IN IRELAND AND THE CERTIFICATION SCHEME.—There seems to be some restiveness among the Approved Societies in Ireland with regard to the scheme for certification of insured persons, recently arranged between the Insurance Commissioners and the medical profession. At a meeting of the Association of Approved Societies held recently in Dublin resolutions were passed demanding the immediate appointment of referees, and asking for a grant to the Approved Societies as pay for additional sick visitors. Again, at the Trade Union Congress held last week in Sligo, a demand was made for the abolition of the present system of certification. As this system has only been in force for a few months, it is much too soon to be able to judge finally of its qualities, and whatever faults it may have, it is certainly an improvement on the haphazard system previously in existence. The societies feel, no doubt, that they have lost the patronage, direct or indirect, which they previously possessed in regard to the appointment of certifiers, and they wish again to get the certifiers into their control. As a matter of fact, the sickness benefits paid in the early part of this year under the new system caused a considerable easing to the societies.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

Richard C. P. Whitcombe to be temporary Surgeon.

ROYAL ARMY MEDICAL CORPS.

Temporary Captain E. W. Skinner to be temporary Major.

Temporary Captain L. C. Somervell relinquishes his commission on account of ill-health.

Temporary Captain J. C. McKerrow relinquishes his commission.

Temporary Lieutenant W. G. Southey to be temporary Captain.

The undermentioned to be temporary Captains: A. H. H. Sinclair, G. D. Mathewson, and J. S. Fowler.

M. Gamble to be temporary Honorary Captain whilst employed with the Withington War Hospital.

The undermentioned to be temporary Lieutenants: Lieutenant R. H. Astbury, from Royal Warwickshire Regiment, T.F., S. B. Hanbury, J. W. Cowie, J. W. Otto van Millingen, F. H. Storey, A. Wilkin, G. J. R. Carruthers, G. J. M. Fraser, K. D. Melville, F. P. Wigfield, T. Peebles, E. Burstal, T. W. E. Ross, J. V. Rees, R. McL. Wishart, W. J. Crow, K. B. Allan, T. N. Darling, J. G. Jack, F. Stevenson, H. M. Leathes, T. McL. Galloway, W. H. Booth, W. S. McLaren, E. R. Eatock, J. McN. Murray, W. H. Peacock, J. F. Gill, Temporary Honorary Lieutenant J. C. N. Harris, R. W. Ironside, P. R. Lowe, H. Blakemore, J. McMurray, E. C. White, N. E. Kendall, H. C. Wilson, R. H. Rattray, R. Lee, E. R. Bastard, K. G. Haig, C. S. O'Neill, H. C. Harper, J. W. B. Hanington, J. R. Micallef, A. B. Howitt, H. M. Churchill, and J. C. Ellis.

Temporary Lieutenants F. C. Drew, J. M. Verster, and C. D. Pile relinquish their commissions.

The undermentioned, having ceased to be employed with the Australian Voluntary Hospital, relinquish their temporary honorary commissions: Major E. T. Thring, Captain W. R. Reynell, Captain G. A. Paul, and Captain L. S. Kidd.

Temporary Lieutenants to be temporary Captains whilst serving with the forces in West Africa: J. Lindsay, A. J. M. Crichton, B. J. Courtney, and R. F. Williams.

Canadian Army Medical Corps: Lieutenant-Colonel A. Mignault to be temporary Colonel. To be temporary Captains: H. S. Smith and Lieutenant W. A. Smith. To be temporary Lieutenant: Lieutenant R. H. Stoddard.

INDIAN MEDICAL SERVICE.

The King has approved the promotion of the following officers:—Lieutenant-Colonel to be Colonel: P. Carr-White. Lieutenants to be Captains: R. R. M. Porter, R. Sweet, E. Calvert, J. R. D. Webb, F. Phelan, A. C. Macrae, Nawin Chand Kapur, A. H. C. Hill, J. F. Holmes, Narayan Krishna Bal, Haji Sulaiman Gulam-hossein Haji. Temporary Lieutenants to be temporary Captains: P. S. Blaker and Shripat Govind Ranaday.

SPECIAL RESERVE OF OFFICERS.

Royal Army Medical Corps.

The undermentioned to be Lieutenants: D. Loughlin, W. J. Vance, G. E. Kidman, from University of London Officers Training Corps, Cadet S. J. Henderson, from Glasgow University Training Corps, and R. B. Hick.

TERRITORIAL FORCE.

Royal Army Medical Corps.

London Casualty Clearing Station: Lieutenant F. A. Dick to be Captain.

Southern General Hospital: Lieutenant-Colonel R. S. Smith resigns his commission.

Highland Mounted Brigade Field Ambulance: Lieutenant (temporary Captain) L. M. V. Mitchell to be Captain.

Western General Hospital: Captain W. A. Hooton, from Territorial Force Reserve, to be Captain.

Northern General Hospital: Captain T. C. Clare is seconded for duty with a General Hospital.

Scottish General Hospital: Major B. Riddell to be temporary Lieutenant-Colonel whilst acting as Administrator of a General Hospital.

London Sanitary Company: Lieutenants K. B. Williamson and J. Tate to be Captains.

Lowland Casualty Clearing Station: To be Lieutenants: D. Campbell and E. McM. Dunlop.

Attached to Units other than Medical Units.—Surgeon-Major S. F. Barber, from the York and Lancaster Regiment, to be Major. Surgeon-Captain J. M. Benson, from West Riding Divisional Engineers, Captain T. J. Costello, from Wessex Field Ambulance, and Lieutenants H. G. Ludolf and J. Lilwall-Cormac to be Captains.

Correspondence.

"Audi alteram partem."

NOTES ON THREE CASES OF CHLORINE GAS POISONING.

To the Editor of THE LANCET.

SIR,—At a time when massive poisoning by chlorine and other gases is in vogue the following notes on poisoning by small but repeated doses may be of general interest. In this instance the sanatorium is making some fairly extensive use of the nascent iodine treatment, so called, as it is supposed that by superimposing chlorine, in the form of freshly prepared chlorine water administered by the mouth, on potassium iodide, given some two to five hours previously, nascent iodine is produced in the region of tuberculous tissue. The preparation of the chlorine is an objectionable matter, and we have devised various methods of so doing; but in the best of these the escape of some free chlorine and its consequent inhalation is unavoidable. I quote three cases.

CASE 1.—The sister in charge prepared the gas regularly at the commencement of the year. It was done in a badly ventilated room, in which she spent some large proportion of her time. She complained of severe rheumatic pains, which did not yield to salicylates. Later she developed a severe bronchitis, which confined her to her room for some three weeks. On recovery all the symptoms disappeared. She was allowed to make no more of the drug. She has since been quite well.

CASE 2.—A medical student, a patient who was taking the preparation personally, volunteered to act as its dispenser. It was now made in an excellently well-ventilated room, but he soon gave up the manufacture as it made him "cough so much at night."

CASE 3.—I now took on the whole of the manufacture. I may say that I have a slightly active tuberculous lesion. I used the well-ventilated room and improved the technique, so that little or no gas escaped except when the apparatus was cleaned. I found the same effects as Case 2—a very irritable cough, originating in the upper air passages, which gets worse at night, especially on lying down. There is a good deal of frothy mucus excreted, but it is difficult to evacuate. Also a tightness across the front and upper part of the chest and shortness of breath (inspiratory). Later the rheumatoid pains occurred, and they are really severe; they make their appearance in the lumbar region and the big joints. The condition improved with a few days in bed, and shortly afterwards I took a fortnight's holiday, when after a few days they completely disappeared, and I had the first good night's sleep I had had for some weeks. On return I at once began to make the gas again, and within a few days I have noticed the cough and pains begin to return.

One evening a bottle containing some weak gas was laid on the ground near a slug. It was most interesting to watch the extraordinary output of mucus by the creature, which in a few minutes was quite enveloped in its own secretions.

I would warn others of the insidious nature of the poison and advise that a proper gas-mask be worn if the stuff must be employed, as well as taking every precaution in the way of ventilation and the use of a proper fume cupboard.

I am, Sir, yours faithfully,

EDWARD BIGG, B.C. Cantab., M.R.C.S., &c.

Nordrach-upon-Mendip, Bristol, August 12th, 1916.

ATMOSPHERIC HEAT AND HUMIDITY IN RELATION TO PYREXIA.

To the Editor of THE LANCET.

SIR,—The leading article on Heat-Stroke in THE LANCET of July 29th draws attention once again to the effect of a hot, damp, and stagnant atmosphere in raising body temperature, and appropriately recalls Professor Haldane's statement, founded on experiment, that when the wet bulb temperature of the air exceeds 31·6° C. (89·0° F.), if the air is still, the body temperature begins to rise, and that even when the air is moving the body temperature begins to rise when the temperature of air approaches that of the body. This seems to be now generally recognised, but that which is not so generally recognised is that the body temperature

begins to rise when the wet bulb temperature of the air is very much lower than 31·6° C. (89·0° F.), even when the air is moving slightly, if there is at the same time a certain degree of atmospheric humidity.

Below I give a series of 60 different combinations of atmospheric heat, humidity, and stagnancy under which body temperature begins to rise, and the degree to which the body temperature was so raised in some in four minutes and in all in less than four hours.

Atmospheric Conditions which Raised Body Temperature in the Cotton Sheds of Lancashire and the Linen Sheds of Ireland.

Degree to which Body Temperature was Raised, and Pulse and Respiration Quickened by Exposure in the Cotton and Linen Sheds.

No.	Temp. of air (F.). Dry.	Wet.	Drying power of air per 10 c.ft. Grains.	Length of exposure. Min.	Body temp. in mouth (F.)	Pulse.	Respirations.
1	90·0	75·0	82·0	90	98·8	94	24
2	89·0	79·0	60·0	105	100·0	108	24
3	89·0	76·0	73·0	75	100·0	108	16
4	88·0	80·0	49·0	75	100·0	108	16
5	88·0	77·5	61·0	165	100·2	104	20
6	87·2	76·0	63·0	165	100·4	100	26
7	87·0	79·0	48·0	75	100·4	108	24
8	86·5	79·5	42·5	135	99·2	92	24
9	86·0	77·5	49·0	75	99·2	80	20
10	85·5	78·0	44·0	90	100·1	82	22
11	85·0	77·0	45·0	232	100·4	120	24
12	84·5	77·0	42·0	210	100·6	96	26
13	84·5	77·5	41·0	210	100·3	130	25
14	84·0	80·0	24·0	60	101·0	114	26
15	84·0	77·0	39·0	195	100·3	84	26
16	83·5	77·5	34·5	225	100·1	100	20
17	83·5	74·0	50·0	235	99·8	116	20
18	83·0	80·0	18·0	120	100·4	128	24
19	83·0	78·0	29·0	210	100·0	100	21
20	83·0	74·0	47·0	215	99·0	104	21
21	82·0	79·0	18·0	160	100·8	126	22
22	82·0	77·0	28·0	190	100·2	80	24
23	82·0	78·0	23·0	30	100·2	80	16
24	82·0	80·0	12·0	230	100·0	107	23
25	81·5	75·5	32·5	45	100·2	112	31
26	81·5	74·0	39·5	176	99·8	86	20
27	81·0	77·0	22·0	155	100·4	120	24
28	81·0	76·0	27·0	190	100·0	140	26
29	81·0	75·0	32·0	5	100·0	112	31
30	81·0	74·0	37·0	185	100·0	82	21
31	81·0	73·0	41·0	160	99·4	84	20
32	80·5	73·0	38·5	215	99·6	92	20
33	80·0	71·0	44·0	120	100·0	90	24
34	79·5	74·5	26·5	223	100·2	95	18
35	79·0	73·5	28·0	39	100·3	110	20
36	79·0	72·0	38·0	185	100·0	90	23
37	78·5	73·5	25·0	175	99·6	116	22
38	78·0	73·0	25·0	120	100·2	108	24
39	78·0	73·5	23·0	4	100·0	100	30
41	77·0	71·0	29·0	120	100·2	88	22
42	77·0	70·0	33·0	120	100·0	100	26
43	76·0	70·0	29·0	120	100·2	88	20
44	76·0	72·0	20·0	120	99·4	88	20
45	75·5	70·5	24·5	225	99·6	132	22
46	75·0	69·5	26·6	34	100·2	110	18
47	75·0	68·0	32·0	205	100·2	88	25
48	74·0	70·0	19·0	180	100·0	98	22
49	73·5	68·0	24·5	45	100·0	90	22
50	73·0	70·0	14·0	15	100·0	80	15
51	72·0	67·0	18·0	10	100·0	72	14
52	71·0	69·5	7·5	30	99·5	—	—
*53	70·5	69·0	7·5	58	99·7	—	—
*54	70·0	66·0	17·0	60	100·0	—	—
55	69·0	65·0	17·0	40	100·0	100	26
*56	68·0	66·5	6·5	24	99·4	—	—
*57	67·5	65·5	9·0	20	99·5	—	—
*58	67·0	63·0	17·0	20	99·6	—	—
*59	66·5	64·0	10·5	20	99·4	—	—
*60	66·0	63·0	12·0	23	99·4	—	—
*61	65·5	63·0	10·0	20	99·4	—	—

The rate of movement of the air could not be calculated as no movement was perceptible.

The above records of atmospheric conditions which raise the body temperature of some of those immersed therein from normal to the degree noted are, with the exception of those marked (*), taken from the appendices to the Reports of the Departmental Committee on Humidity and Ventilation in the Cotton Weaving Sheds of Lancashire and in the Linen Weaving Sheds in Ireland. I have, however, given the drying power of the air, calculated from the dry and wet bulb temperatures in the sheds, instead of the relative humidity, as more clearly showing the degree of impediment to loss of heat from the body by evaporation, presented by the atmosphere in the sheds. The records marked (*) are from observations made by me, No. 54 in the orchestral stalls of a theatre at a matinee performance, and the others in glass houses artificially heated and humidified for the cultivation of orchids, crotons, grapes, tomatoes, &c. These I have added to carry the series to as low a degree of atmospheric temperature as possible.

It can be seen from this series of observations that the body temperature of some will begin to rise when the wet bulb temperature of the air is as low as 18·3° C. (65·0° F.), if no movement of the air is perceptible and the dry bulb temperature of the air is not above 19·4° C. (69·0° F.). If my own observations are correct the body temperature begins to rise when the wet bulb temperature of the air is only 17·2° C. (63·0° F.), if no movement of the air is perceptible and at the same time the dry bulb temperature of the air is not above 18·8° C. (66·0° F.). In addition to rise of body temperature and acceleration of the pulse and respiration, exposure to the warm or hot, damp, and stagnant atmosphere in the weaving sheds, also caused malaise, muscular pains, drowsiness, dizziness, headache, chilliness, and shivering. Repeated exposure to such atmospheric conditions gives rise to anæmia and more serious effects.

The value of the foregoing table of combinations of atmospheric heat, humidity, and stagnancy, which raise body temperature, is that it supplies a standard by comparison with which we may see whether the natural meteorological conditions at any particular place are such as will cause pyrexia or not. It may thus help, perhaps, to throw some light on the causation of certain pyrexias of short duration and of (at present) uncertain origin, such as "trench" fever. By such comparison I have elsewhere[1] given my reasons for believing that in the season when malarial fevers are prevalent, at Calcutta, Madras, and Bombay in India, at Puttalam and Kurunegala in Ceylon, at Singapore in the Straits Settlements, and at Ancon, Colon, and Culebra in the Panama Canal Zone, the atmospheric conditions are such as will cause paroxysms of intermittent pyrexia, each paroxysm from 4 to 14 hours or even longer in duration. Indeed, the term Mal'Aria would be a most suitable one to describe briefly atmospheric conditions which produce pyrexia in the cotton sheds or elsewhere. And, doubtless, this was how the term came to be applied to the disease malaria as well as to the atmospheric conditions which were originally believed to cause this disease.

I am, Sir, yours faithfully,

MATHEW D. O'CONNELL, M.D.,
Colonel, R.P.; late A.M.S.

Harrogate, August 4th, 1916.

TREATMENT OF THE MAIN NERVES IN AMPUTATIONS.

To the Editor of THE LANCET.

SIR,—I wish briefly to draw attention to a subject which I think has not received the care its importance demands. It does not much prolong the time taken in an amputation, if the main nerves are drawn down out of their fascial envelopes, and an inch or more of the nerve trunks cut away with scissors. The leaving of the main nerves in a stump, to be entangled and subsequently pressed upon by cicatricial tissue, is responsible for painful "neuralgic" stumps. These are at once a source of intolerable suffering to the patients, and of despair to those who have to fit them with artificial limbs. Furthermore, the primary dressings, if there are no main nerves left free in the stump, are rendered far less painful. This is a matter of no small moment in the many amputations now done through septic tissues, where the flaps heal badly, where subsequent scar-tissue is very abundant and contractile, and where "packing" of the stump with salines or other applications has often to be resorted to. In all the amputations of the upper extremity and also of the leg, this drawing out and "cutting short" of the main nerves is of importance. In the thigh the sciatic nerve retracts markedly as a rule, but if long and prominent it should be similarly treated. I do not know if this procedure is advocated in

[1] Journal of Tropical Medicine, 1911 to 1916.

modern text-books. I have employed it for years with advantages hardly to be exaggerated. I venture now to present it to the consideration of those employed in the surgery of the present war.

I am, Sir, yours faithfully,

A. MARMADUKE SHEILD,
Consulting Surgeon to St. George's Hospital.

August 14th, 1916.

THE PSYCHO-PATHOLOGY OF WAR NEUROSES.

To the Editor of THE LANCET.

SIR,—Captain M. D. Eder's article on this subject was very interesting to read. But are his conclusions sound? All science is based on accurate observation. Where I can test Captain Eder's statements it seems very probable that he has made an inaccurate observation. In Case 7 there is a young man whose bent is towards ships and ship-building. He has obviously been often on the bridge of a ship. Yet Captain Eder reports him as saying, "I ..... rang down full speed ahead." Now, that is what Captain Eder probably thinks is said by sailors, but it is not: "*full steam ahead*" is what is seen on every ship's telegraph. So it seems very likely to me that Captain Eder has allowed his preconceptions to distort the accuracy of his observations. And if it is so in this case it is probably so in others.

I am, Sir, yours faithfully,

G. BURTON-BROWN, M.D.

Harston, Sidmouth, August 14th, 1916.

CHINESE TOE-ROT AND FOOT-TETTER.

To the Editor of THE LANCET.

SIR,—In your issue of June 10th (p. 1200) occurs a short note on "Chinese Toe-Rot." A condition similar to that described is fairly common in Nigeria, and presumably in most tropical countries, but we do not consider that it need be as intractable as indicated in your note. Treatment with various antiseptics and dusting powders as a rule alleviates but does not cure.

The method we advise, based, clinically only, on the fact that the organisms appear to flourish in an acid medium, is usually much more rapidly effective, and consists merely in the repeated application of an antiseptic ointment rendered alkaline in some convenient way, e.g., by adding 5 gr. of sod. bicarb. to an ounce of ung. hyd. nit. dil. We have seen a case that had withstood three years' treatment with sulphur or iodine and various antiseptic dusting-powders yield to the treatment indicated within three or four weeks.

We are, Sir, yours faithfully,

J. McF. POLLARD, M.D. Lond.,
West African Medical Staff.
J. E. L. JOHNSTON, M.B., B.S. Lond.,
D.T.M. and H. Camb.,
West African Medical Staff.

Zungeru, Northern Nigeria, July 10th, 1916.

ALIMENTARY REST IN DIABETES.

To the Editor of THE LANCET.

SIR,—Dr. O. Leyton's letter in THE LANCET of July 8th, I really think, is somewhat captious. The article criticised stated that Guelpa's theory was not generally accepted, and described Allen's method as a "decided advance," which is hardly doing Allen "very scant justice." I was present at the debate. It was generally agreed that mild cases in later life usually respond rapidly to some such method of fasting. In the more severe cases the urine may be freed from sugar temporarily, but sometimes the general well-being of the patient suffers, though even in these severer cases modified fasting will probably be very useful. So far I am in accord with your editorial views. But if Dr. Leyton will turn to the official record of that debate he will find that of the four speakers who followed him, three made statements to that effect. Dr. Spriggs said: "I am inclined to think that in treating a chronic disease it is of importance to maintain the patient in such a state of nutrition that he can work and can enjoy himself." Dr. Ryffel said of his cases that "three were severe, in whom considerable difficulty was experienced in preventing the recurrence of sugar when food was given, so much so that it appeared a better plan to regulate the acetonuria by periodical starvation and not to aim at complete elimination of glycosuria." Dr. Cammidge said: "The dangerous increase in the acidosis, &c., observed by Stillman in some 10 per cent. of his cases while undergoing Allen's treatment points to there being limitations to the usefulness of the method."—I am, Sir, yours faithfully,

M.D.

August 11th, 1916.

THE EFFECTS OF TRI-NITRO-TOLUENE ON WOMEN WORKERS.

To the Editor of THE LANCET.

SIR,—The observations by Dr. Agnes Livingstone-Learmonth and Dr. Barbara M. Cunningham in your issue of August 12th are interesting as a contribution to the study of T.N.T. poisoning, and prompt these questions: 1. What methods were adopted for selecting the workers? 2. How many applicants were rejected? 3. What are the homes like? 4. How many are unable to take milk, eggs, or cheese, the great lime-bearing foods? 5. Are many of them fond of vinegar, lemons, and acid fruits? 6. What is the state of the teeth?

The writers emphasise the value of cleanliness with what seems but little regard for circumstances. How can working women afford to change constantly their underclothing? Among a class where, when teeth are bad, the cavities are stopped with bread, it is not surprising that underclothes should not be changed. It is here that social workers find an *impasse*, which can be surmounted only when priests and parsons realise that their responsibility begins in this life, or, to put it more plainly, until they take a more active share in the social work of their people, an example that is set them by the Rabbi of the Hebrew community.

I am, Sir, yours faithfully,

G. ARBOUR STEPHENS.

Swansea, August 14th, 1916.

Obituary.

MORTON ALFRED SMALE, M.R.C.S. ENG., L.S.A., L.D.S.,

CONSULTING SURGEON-DENTIST, ST. MARY'S HOSPITAL, ETC.

THE death of Mr. Morton Smale in the midst of his activities, at the age of 69, is a serious loss to the dental branch of the profession of surgery. During the 40 years that have elapsed since he first qualified there is hardly any post of responsibility in the world of dentistry which he has not occupied. We say hardly any, because he never was President of the Odontological Society, neither was he President of the British Dental Association, but it is understood that he refused both these honours.

Morton Smale received his medical education at St. Mary's Hospital, where he afterwards became dental surgeon, having previously served in that capacity at the West London Hospital. He was medical tutor at the Dental Hospital of London, and in 1883 succeeded Mr. Francis Ken Underwood as dean of that institution, a post which he occupied with conspicuous success for 20 years. During that period he effected great changes in the hospital. He was the guiding spirit in the removal of the hospital from its original site to the present building, and bore no small part in the task of raising the necessary funds. In this difficult enterprise he was greatly assisted by his brother, Mr. William Smale, and very loyally supported both in sharing the work and subscribing the money by the then staff. During his deanship the Dental Hospital of London received the title of Royal. Another great work, costing many months to arrange and many years' constant daily supervision, was the formation, in the face of much opposition, of the appliance department of the hospital. This scheme was planned in 1889 by Mr. Morton Smale, Mr. David Hepburn, and Mr. A. S. Underwood. It was the first attempt to deal with the problem of supplying artificial teeth to suitable poor cases, a small fixed sum being demanded towards current expenses. This initiative was subsequently followed by most dental hospitals in the kingdom.

Mr. Smale's connexion with the Royal College of Surgeons of England was long and intimate. In 1886 he induced the Council of the College to allow a part or the whole of the three years' course of instruction in mechanical dentistry to be taken before registration. In 1889 he was appointed to

the Board of Examiners in Dental Surgery of the College, and remained on the Board until 1901, having been re-elected for a third period of two years to assist in the rearranging of the examination. In 1896 he was appointed one of the original members of the committee to decide the award of the John Tomes Prize for Scientific Research in Dental Science. In 1899 he visited the United States of America in company with Mr. E. Lloyd Williams, with the object of carefully investigating the methods of dental education and examination in that country, and in 1900 he presented an exhaustive report upon the subject to the Council of the College which was very useful to that body.

In 1913, when the International Medical Congress met in London, Mr. Smale was President of the Stomatological Section, and the success which attended that portion of the great gathering was largely due to his efforts, ably seconded by the honorary secretary, Mr. J. F. Colyer. The scientific work credited to the Congress has left a lasting mark on dental science. Soon after the outbreak of the war Mr. Smale was asked by the late Mr. Edmund Owen and Sir Frederick Treves to organize the dental department of the new hospital for wounded then being fitted out by the St. John Ambulance and the Red Cross Society. This he did, and remained one of the honorary dental surgeons until his death.

Morton Smale was always convinced of the importance of regarding dental surgery as a branch of general surgery, and lost no opportunity of advocating that view. His death will be widely felt in the profession generally, many of whom are his old pupils and colleagues.

ALBERT FRÄNKEL.

Albert Fränkel, the discoverer of the pneumococcus and its causal relation to pneumonia, died in Berlin on July 6th at the age of 68 years. A sympathetic account of his life appears in the *Deutsche Medizinische Wochenschrift* of July 25th from the pen of his colleague, F. Kraus. Fränkel was one of the earliest pupils of von Leyden and followed worthily in the footsteps of his distinguished uncle, L. Traube. For many years he was director of the medical section of the Am Urban Hospital in Berlin; but although for long one of the most prominent clinicians in Berlin and with a large and widespread consulting practice, he never obtained a teaching appointment at the University, an omission which was always a keen source of regret to him. Apart from his fame in association with the pneumococcus, Fränkel will be remembered for his contributions to medical literature on the subject of respiratory diseases. He was one of the founders of the Association of Physicians (Verein für innere Medizin), of which he was for long the tireless President. His death removes one of the few remaining names in German medicine which are well known in this country.

JOHN EUSTACE WEBB, M.B., C.M. ABERD.,

SURGEON, ROYAL NAVY (RETIRED).

Dr. J. E. Webb, who died suddenly at his residence in Looe, Cornwall, on August 6th, was a son of Dr. F. C. Webb, the editor of the *Medical Times and Gazette*. He graduated M.B., C.M. of Aberdeen University in 1884, and shortly afterwards entered the Royal Navy as assistant surgeon. He was at one time on the medical staff of the Royal Naval Hospital, Haslar. On his retirement he practised at Looe, where he held several appointments, including that of Admiralty surgeon and agent and port medical officer of health. Dr. Webb will be greatly missed in Looe, where he was held in the highest esteem, and much sympathy is felt there for his widow and two children.

A CONVICTION UNDER THE DENTISTS ACT.—At the Marylebone police court, on July 28th, Henry John Goldberg was charged with unlawfully taking and using the description of dentist. Mr. R. W. Turner, who appeared for the British Dental Association, stated that two summonses had been issued against the defendant, one for implying that he was "registered under the Act," and the other for implying that he was "specially qualified" in advertisements which had appeared in various weekly periodicals. He called attention to a previous conviction on June 22nd, 1915 (see THE LANCET, July 3rd, 1915, p. 35), for using the words "Dental Practitioner," when the defendant was fined £20 and 5 guineas costs. Mr. Snell said that the defendant pleaded guilty to the charge. The magistrate imposed the maximum penalty of £20 and 10 guineas costs.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

Killed.

Captain H. R. Knowles, R.A.M.C., attached to the Royal Lancashire Regiment, was educated at Leeds University, graduating M.B., Ch.B. in 1914. He joined the R.A.M.C. shortly afterwards, and was awarded the Military Cross in April last.

Captain A. P. Low, R.A.M.C., attached to the Seaforth Highlanders, was educated at Edinburgh University and qualified in 1896. After holding appointments at the Dundee Royal Infirmary and at Craiglockhart Poorhouse he took up practice in Dundee, and joined the R.A.M.C. in 1912.

Captain D. H. D. Wooderson, R.A.M.C., attached to the Liverpool Regiment, was a student at St. Bartholomew's Hospital, London, and joined the R.A.M.C. shortly after qualifying in 1914.

Wounded.

Lieutenant B. Graves, R.A.M.C., attached to the North Staffordshire Regiment.

Captain C. H. Wood, New Zealand Medical Corps.

Lieutenant R. Felton, R.A.M.C., attached to the Middlesex Regiment.

Captain G. J. Fraser, R.A.M.C., attached to the Northumberland Fusiliers.

Lieutenant F. L. Keith, R.A.M.C., attached to the Northumberland Fusiliers.

Missing.

Surgeon-Probationer G. S. Freeman, H.M.S. *Lassoo*, R.N.V.R.

Prisoner at Kut-el-Amara.

Major E. A. Walker, Indian Medical Service.

Previously reported Believed taken Prisoners at Kut-el-Amara now reported Prisoners.

Major E. F. E. Baines, Indian Medical Service.
Captain S. G. S. Haughton, Indian Medical Service.
Lieutenant R. V. Martin, Indian Medical Service.
Captain A. T. J. McCreery, R.A.M.C.

Believed taken Prisoners at Kut-al-Amara.

Captain P. B. Bharucha, Indian Medical Service.
Lieutenant N. S. Jatar, Indian Medical Service.

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Lieutenant R. W. Vaughan-Roberts, Liverpool Regiment, elder son of Dr. W. Vaughan-Roberts, J.P., of Blaenau Festiniog, North Wales.

Second Lieutenant P. M. Alexander, Gordon Highlanders, eldest son of Dr. S. P. Alexander, of Southsea.

Lieutenant Q. M. V. Bidie, Royal Flying Corps and Royal Scots, only son of Lieutenant-Colonel G. Bidie, I.M.S.

Captain J. G. Hurd-Wood, Infantry Brigade, son of the late Dr. J. Hurd-Wood, of Whitmead Hill, Farnham.

Captain H. R. Knowles, R.A.M.C., attached to the Lancaster Regiment, eldest son of Dr. H. Knowles, of Heysham, late of Barnsley.

Captain P. Wood, 89th Punjabis, youngest son of the late Brigade-Surgeon J. Wood, of Lichfield.

Captain G. Blackader, Canadian Infantry, son of Dr. A. D. Blackader, of Montreal.

Private C. C. Keelan, H.A.C., youngest son of the late Dr. N. W. Keelan, of Dominica, West Indies.

Second Lieutenant W. C. Bower, King's Own Royal Lancashire Regiment, elder son of Dr. W. Bower, of Ottery St. Mary, and late of Hendon.

Private W. L. Roberts, Royal Warwickshire Regiment, third son of Dr. R. L. Roberts, of Ruabon, North Wales.

Lieutenant C. T. C. Irvine, 25th Punjabis, son of the late Surgeon-General J. Irvine, R.N.

Private J. G. Burnie, Royal Fusiliers, elder son of Dr. W. G. Burnie, of Bradford.

Private E. J. D. Fooks, Otago Regiment, younger son of Lieutenant-Colonel G. E. Fooks, I.M.S.

Private C. G. Weldon, South African Infantry, only son of the late Dr. G. Weldon, of London.

Captain F. L. Newstead, Durham Light Infantry, eldest son of Dr. G. Newstead, of Blyth, Northumberland.

OBITUARY OF THE WAR.

ALFRED MAURICE THOMSON, M.B., B.S. R.U.I.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain A. M. Thomson, who was killed in action in France on July 7th at the age of 31, was the only son of Alfred Thomson, of Marlborough Park, Belfast. Educated at the Royal Academical Institution and at Queen's College, Belfast, he graduated M.B. in 1909, subsequently obtaining the D.P.H. of Cambridge. Volunteering for service soon after the outbreak of war, he had been at the front since June 1st, 1915. He was wounded when rescuing his adjutant under heavy fire, and as he continued to attend to the injured was subsequently killed outright by the explosion of his ammunition pouch.

His commanding officer speaks of the loss of Captain Thomson as of a personal friend, and other letters from fellow officers and colleagues confirm the impression of a man quite fearless in the carrying out of his duties. He was in practice in Belfast prior to obtaining his commission, and his early death is keenly felt there.

JOHN HENRY DYKE ACLAND, M.R.C.S. ENG.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain J. H. Dyke Acland, who was killed on active service in France on the night of July 12th, was born in 1880 and was the second son of the late Rev. Henry Dyke Acland, rector of Luccombe, Somerset. He was educated at Blundell's School and afterwards at St. Thomas's Hospital, where he qualified as M.R.C.S. and L.R.C.P. in 1905. He became house surgeon to the East London Hospital for Children, Shadwell, and house physician at the West London Hospital. After completing these resident appointments he went to South Africa as medical officer to the Beira railways, and practised for some years in Buluwayo, the chief town of Southern Rhodesia. At the outbreak of war he returned to England and applied for a commission in the Royal Army Medical Corps, being gazetted lieutenant on Oct. 17th, 1914. In November of the same year he married Elizabeth Margaret, daughter of Charles Corner, of The Lodge, High Ham, near Langport, Somerset. He was an enthusiast in his work and of a genial and cheery disposition, which brought him many friends and made him welcome wherever he went. He met with his death in a way in which he himself would have desired — whilst endeavouring to relieve a wounded man.

The officer commanding his battalion writes of Captain Dyke Acland: "He went out in the front of our line to try and find a wounded man who was reported to be there. By the greatest misfortune he was hit by a bullet and died almost at once. He is a very great loss to us; besides being a skilful doctor, he was a most cheery companion, and we all miss him dreadfully. He did most gallant work in the attack on July 1st. I immediately recommended him for the Military Cross, and if he had been spared there is not the least doubt that he would have been awarded it. He died whilst trying to perform an act of mercy."

HUGH GWILYM MORRIS, B.A., M.B., B.CH. OXON.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

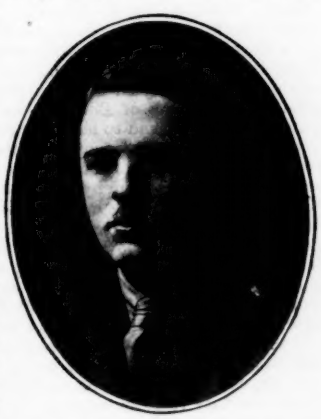
Captain H. G. Morris, who was killed in action in France on July 14th, at the age of 32, was the only son of William Morris, estate agent, of Glanllyn, Bala. He was educated at Llandovery College and went on from there in 1904 to Oxford, where he graduated B.A. in 1908, and M.B. in 1914, after having spent part of his medical course at the London Hospital. Whilst an undergraduate at Oxford Captain Morris was keen on football; he played in the University team, and was a reserve blue. He also played for several London clubs, and was a member of the London Hospital football team. In January, 1915, he took a commission in the Royal Army Medical Corps, and was promoted Captain a year later. He was killed outright whilst in the act of saving a wounded soldier under circumstances for which he was recommended by his commanding officer for the Victoria Cross.

In a letter to Captain Morris's parents a colleague alludes to his popularity in the service, and the fact that many of his fellow officers would miss him keenly. The commanding officer wrote that he died as he had lived—a pattern of unselfishness—considering himself last. Captain Morris was married in 1911, and leaves a widow and two children.

RICHARD FENTON THEODORE NEWBERY, M.B., CH.B. EDIN.,

LIEUTENANT, ROYAL ARMY MEDICAL CORPS.

Lieutenant R. F. T. Newbery, who was killed in action in France on July 14th, at the age of 25, was elder son of the late E. C. Newbery, and was born at San Remo, spending his early years there and at Nice. He was educated at Tonbridge School, and after passing the London matriculation examination he entered as a student of medicine at Edinburgh University, graduating there in March, 1915. As an undergraduate he was an active member of many of the students' gatherings, being senior president of the Philomathic Society in the year 1914–15. Besides this he took a keen interest in social work and belonged to the University Settlement. After a short period as junior house surgeon at the Edinburgh Royal Infirmary he joined the Royal Army Medical Corps in November, 1915, and was attached to the Northamptonshire Regiment. Recommended for the Military Cross on July 1st, he was killed instantaneously a fortnight later by a shell as he was attending the wounded.



One of his old Edinburgh teachers writes of Lieutenant

Newbery as a man on whom he could always depend for carrying out intelligently and well whatever practical work was entrusted to him. It is evident from their letters that his men had a similar confidence in him. "He always looked after us so well, and would never lead us to a place he would not go himself." His coolness and efficiency in danger were products of his self-forgetfulness and a desire to do his duty without external show.

THE CENTRAL MEDICAL WAR COMMITTEE.

The Committee met on Wednesday last, the time being mainly occupied in considering, sitting as the Central Professional Committee, applications for exemption from military service referred to the Committee by local tribunals.

The difficulties that might arise in connexion with disabled soldiers came under discussion, for it was recognised that it might be necessary in the interests of these men to retain at certain hospitals medical practitioners who are within the age-limit for accepting commissions.

THE PENSIONS SCALE FOR AMPUTATIONS IN THE NAVY.

Dr. Macnamara stated in Parliament on Wednesday that the Admiralty has adopted the scale of pensions for amputations which was settled by the Chelsea Commissioners for the Army. Up to the adoption of the new scale the Admiralty allowance was 10*s.* 6*d.* a week in respect of the loss of a limb. The Army scale is as follows:—Loss of leg: Off up to the hip, 16*s.* (weekly); short thigh, 14*s.*; above the knee, 12*s.* 6*d.*; below the knee, 10*s.* 6*d.* Loss of arm: Right arm to the shoulder, 16*s.*; left arm to the shoulder, 15*s.*; above or through elbow-joint (right arm), 14*s.*, (left arm), 13*s.*; below the elbow (right arm), 11*s.* 6*d.*, (left arm), 10*s.* 6*d.*

HOSPITAL UNITS FOR RUSSIA: SURGEONS WANTED.—The Joint War Committee of the British Red Cross Society and the Order of St. John of Jerusalem in England is shortly despatching two field-hospital units for service in Southern Russia. We are asked to state that there are still vacancies for two experienced surgeons in these units, and the Committee would be glad to receive immediate offers from surgeons who are willing to proceed abroad and are able to do so under the present War Office Regulations. Application should be made, if possible in person, at 11 o'clock any morning, at 83, Pall Mall, Room No. 93, or by appointment at other hours.

THE PAY OF A SPECIAL RESERVE R.A.M.C. OFFICER.—We have received the following letter from a correspondent who considers that the inequalities of pay, as shown by the sums received by Special Reserve and Temporary officers, ought to be abolished:—"I have recently completed two full years of active service at home and abroad. As a Special Reserve R.A.M.C. officer I had already been trained for my duties, and was also required to give my services immediately on mobilisation. I had received three retaining fees, each of £20—not an extravagant allowance considering that I had to leave my practice without even an opportunity to introduce my patients to a deputy. I wish to compare my receipts during the two years from army sources with that of an hypothetical temporary lieutenant, R.A.M.C., who should have performed exactly the same duties, but who, of course, was not already trained, left his practice at his own convenience, and had had no retaining fees. My total receipts, including allowances for travelling and every other sort of payment, were £877 0*s.* 6½*d.*, which works out at 24*s.* a day. (About £600 of this was taxed before receipt, so that I did not actually handle this sum.) The temporary officer would have received for the same duties £997 13*s.* 11½*d.*, i.e. 27*s.* 3*d.* a day. Deducting from both allowances for equipment on mobilisation, for travelling, and for extra duty (e.g. as surgeon, in charge of hospital, &c.) the two sums would be £786 3*s.* 0½*d.* and £926 16*s.* 5½*d.*, or 21*s.* 6*d.* and 25*s.* 4*d.* a day—roughly, my extra experience and extra readiness has cost me £120. Not very long ago Mr. Tennant stated in the House of Commons that there was not much difference in the pay of Special Reserve (and Territorial, who are similarly penalised) officers. I find £60 a year quite an appreciable difference, and venture to think that most medical men will share that view. As the question of what the officer belonging to each class actually gets is complicated by the allowances each may draw, and so lends itself admirably to mis-statement, I hope that you may find room for this short statement."

TWO YEARS' WORK BY THE WOUNDED ALLIES' RELIEF COMMITTEE.—The committee was one of the first war charities to be started after the outbreak of war, the nucleus having been formed on the evening of August 4th, 1914, the very day of the declaration of war by Great Britain. The first task of the committee was to help to bring wounded Belgian soldiers to England and to distribute them in hospitals. Since then the relief work has extended to many other spheres, and touches in one way or another all our Allies. With regard to activities for Belgium, the committee has maintained two homes for disabled Belgian soldiers in England, where they have been fitted with artificial limbs and taught various trades to render them self-supporting, and it also keeps up a sanatorium at Eastleigh for Belgian soldiers suffering from phthisis; it has presented to the Belgian Army four bath-caravans for use at the front, also a caravan soup-kitchen to supply the troops in the trenches with hot tea, coffee, or soup, and, in addition, two bath-caravans made on an improved plan and capable of furnishing 70 hot baths an hour.

In France the committee is maintaining two hospitals for French soldiers—the one at Limoges, containing 225 beds, the other at Lyons, with 300 beds.

To the Russian Red Cross Society the committee has given four motor ambulances, each containing four stretcher-beds, and to the Italian Army it is supplying a motor operating theatre, the first of its kind ever constructed, that will enable urgent operations to take place at the front, and thus save the lives of many wounded men who might otherwise die on their way to hospital.

Concerning relief work for Serbia and Montenegro, the committee sent out a fever unit, consisting of doctors and nurses, to Serbia, and up to the time when the Austrians took possession of the country, it was maintaining one large hospital in Kragujevatch, and another in Podgoritza, and since the retreat of the Serbian Army has sent out fresh units with stores and provisions to Corfu, where a vast amount of work has been and is being done, attending to the disease-stricken remnants of the Serbian Army.

For the benefit of all our Allies the committee supplies from its hospital depôt all sorts of bandages and other hospital requisites, and in the first half of 1916 supplied the hospitals of our Allies with over 175.000 articles. London hospitals for British wounded have also received gifts from the depôt. And in addition to the activities referred to, the committee has equipped and maintained various other hospitals and homes, both at home and abroad, giving the relief that was needed when it was needed.

HAROLD FINK HOSPITAL, PARK-LANE.—Mrs. Catherine Fink has endowed beds at this hospital to the extent of £5000, and has requested Dr. Douglas Shields to administer the endowment fund. The Duchess of Portland has consented to act as nominator of patients for the beds, which are available for the free treatment of officers disabled by the war.

"BEHIND THE LINES."—We have received Nos. 1 and 2 (the May and June–July issues) of a little magazine with this title designed principally to interest and amuse the sick and wounded in the No. 10 Stationary Hospital at the front. No. 1 contains a well-reproduced photograph of the officers of the hospital, and No. 2 a reproduction of a photograph of the whole staff. The address is "Somewhere in France."

DONATIONS AND BEQUESTS.—The Royal Westminster Ophthalmic Hospital has received a grant of £400 from the trustees of the Zunz Bequest.—Miss Burrell, of Fairthorn Manor, Curdridge, has sent a donation of £600 to the Royal Hants County Hospital, Winchester.

A CAB-WHISTLING PROHIBITION.—It is understood that regulations prohibiting whistling for taxi-cabs between the hours of 10 P.M. and 7 A.M. are to come in force next week in certain specified areas of London, including those containing the military hospitals and, perhaps, in the whole London County Council area.

Medical News.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—As the result of the Final Examination, held from July 4th to 25th, the following candidates were among those approved in the undermentioned subjects, but have not yet completed the examination:—

Medicine.—H. Archer, L.M.S.S.A., Bristol; C. W. Armstrong, B.A. Oxon., London; J. R. Banks, University College; Alethea Josephine Bolton, Birmingham; H. C. Broadhurst, M.B., B.S. Durh., Durham; Stella Churchill, Royal Free; W. S. Dawson, Oxford and St. Thomas's; G. Day, St. Bartholomew's; M. A. B. Demerdash, University College; A. R. Dingley, St. Bartholomew's; H. Evers, M.B., B.S. Durh., Durham; H. Fernando, Ceylon and Middlesex; Susan Alfreda Finch, Royal Free; J. Hale, B.A. Cantab., Cambridge and St. Thomas's; J. M. Harrison, St. Thomas's; J. A. Hill, London; G. Hoffmeister, Middlesex; O. C. L. Hughes, Birmingham; S. R. Johnston, University College; G. M. Kendall, B.A. Cantab., Cambridge and St. Thomas's; E. I. Lloyd, B.A. Cantab., Cambridge and St. Bartholomew's; A. N. McMillan, M.P.S., Middlesex; W. W. H. Miles, St. Thomas's; F. M. Mosely, B.A. Cantab., Cambridge and London; C. L. Odam, B.A. Cantab., Cambridge and Guy's; Eleanor Joyce Partridge, Royal Free; Enid Maud Pfeil, Royal Free; B. H. Pidcock, St. Bartholomew's; C. N. Ratcliffe, Liverpool; P. R. Riggall, University College; E. D. Roberts, M.D. Lausanne, Lausanne; R. R. Scott, Durham; N. M. Sen-Gupta, London; F. N. Sidebotham, B.A. Cantab., Cambridge and Guy's; R. G. Simpson, London; Flora Nihal Singh, Calcutta and Royal Free; J. W. G. Steell, M.A. Oxon., Oxford and Manchester; D. Stewart, Manchester; M. B. M. Tweed, L.S.A., Guy's; Anna Petronella van Heerden, Amsterdam; G. H. Ward, B.A. Cantab., Cambridge and St. Thomas's; E. Williams, L.S.A., L.R.C.P. Lond., London Hospital; T. P. Williams, Middlesex; and A. T. Woolward, B.A. Cantab., Cambridge and London.

Surgery.—J. A. M. Alcock, Guy's; E. J. Ball, Ph.D. Heidelberg, Bristol; J. F. Carter Braine, Guy's; P. A. Buxton, B.A. Cantab., Cambridge and St. George's; W. J. Colborne, Charing Cross; A. V. S. Davies, St. Mary's; W. S. Dawson, Oxford and St. Thomas's; A. R. Dingley, St. Bartholomew's; H. Evers, M.B., B.S. Durh., Durham; H. A. Faulkner, Melbourne and Middlesex; E. O. Goldsmith, B.A. Cantab., Cambridge and St. Bartholomew's; L. Grey, Cardiff and University College; W. O. Holst, Middlesex; D. B. S. Jones, Charing Cross; D. L. Lees, Bristol; R. T. Lewis, University College; J. A. Martin, Guy's; R. Moser, St. Bartholomew's; M. A. Omar, Cairo and Charing Cross; Lily Fanny Pain, L.D.S. Eng., L.S.A., Royal Free; A. Pastel, Charing Cross; G. Perkins, B.A., M.B., B.Ch. Oxon., Oxford and St. Thomas's; A. Rodd, University College; R. R. Scott, Durham; S. N. Scott, Charing Cross; J. F. Smith, St. Thomas's; R. N. Vakil, University College; S. Vidot, Guy's; O. Williams, B.Sc. Wales, Cardiff and University College; and C. Young, University College.

Midwifery.—G. Adler and E. Ahmed, London; J. A. M. Alcock, Guy's; E. M. Atkinson, St. Bartholomew's; H. R. Bickerton, B.A. Cantab., Cambridge and Liverpool; H. J. Blampied, St. Thomas's; Hilda B. Kathleen Brade, M.Sc. Manch., Manchester; J. Brash, Cambridge and St. Bartholomew's; H. C. Broadhurst, M.B., B.S. Durh., Durham; W. S. Brown, B.A. Cantab., Cambridge and St. Thomas's; J. Burke, Glasgow and London; C. H. Carroll, London; H. J. C. Churchill, St. Bartholomew's; Hetty Ethelberta Claremont, Royal Free and St. George's; G. F. Cobb, St. Bartholomew's; E. J. Coombe, St. George's; A. W. A. Davies and J. E. E. de Robillard, Guy's; J. R. Dingley, University College; P. R. Doctor, M.B., B.S. Bombay, Bombay; A. F. R. Dove, M.B., B.S. Durh., Durham; H. W. Eddison, B.A. Cantab., Guy's; A. A. H. El Zeneiny, Cairo and London; J. S. Ellis, B.A. Cantab., and L. H. B. Evans, B.A. Cantab., Cambridge and Guy's; H. Evers, M.B., B.S. Durh., Durham; J. H. Ewen, St. Mary's; H. A. Faulkner, Melbourne and Middlesex; S. A. Finch, Royal Free; F. L. Fonseka, Ceylon and St. Mary's; F. C. A. Frith, Bristol; H. D. Gardner, B.A. Cantab., Cambridge and University College; M. D. Geffen, University College; E. A. Gibb, B.A. Cantab., Cambridge and St. Thomas's; G. H. Gidlow-Jackson, B.A. Cantab., Cambridge and London; H. Gluckman, London; L. B. Goldschmidt, King's College; M. Gourevitch, Paris and London; H. O. Gunewardene, King's College; D. V. Hals ead, Guy's; E. G. Harris, London; G. C. Hartley, M.B., Ch.B. Birm., Birmingham; R. B. Hawes, St. Thomas's; C. W. Hayward, Birmingham and University College; O. C. L. Hughes, Birmingham; J. M. Hughes, Middlesex; J. W. D. Hyde, University College; T. G. James, Cardiff and Westminster; J. P. J. Jenkins and N. R. Jenkins, Cardiff and Westminster; Tamara Jochelman, M.D. Berne, Berne and Royal Free; S. R. Johnston, University College; M. C. Joynt, Guy's; G. M. Kendall, B.A. Cantab., Cambridge and St. Thomas's; J. I. Kuhne, Charing Cross; E. A. Leviseur, Guy's; J. B. S. Lewis, B.A. Cantab., Cambridge and St. George's; W. H. Maudling, Charing Cross; A. N. McMillan, M.P.S., Middlesex; L. C. Moore, Liverpool and St. Thomas's; A. Morford, B.Sc., St. Bartholomew's; A. H. Morris, Bristol; J. W. M. Nicholl, B.A. Cantab., Cambridge and Middlesex; C. L. Odam, B.A. Cantab., Cambridge and Guy's; A. L. Packham, L.D.S. Eng., Middlesex; Margaret Stuart Palmer, Royal Free; J. A. Panton, Manchester; G. Perkins, B.A., M.B., B.Ch. Oxon., Oxford and St. Thomas's; A. M. Pickup, Birmingham and University College; C. V. Pink, St. Thomas's; F. Portas, Westminster; W. E. Powell, Charing Cross; S. H. de G. Pritchard, London; W. M. A. Rahman, University College; A. H. Richardson, St. Thomas's; P. R. Riggall, University College; E. D. Roberts, M.D. Lausanne, Lausanne; A. Rose-Innes, University College; K. M. Ross, London; A. H. Samy, Cairo and St. Bartholomew's; M. M. Shaffi, London; G. E. L. Simons, Guy's; Flora Nihal Singh, Calcutta and Royal Free; F. H. Smith, M.A. Cantab., L.D.S. Eng., Cambridge and St. George's; N. F. Smith, B.A. Oxon., Oxford and St. Bartholomew's; R. J. Staley, M.B., Ch.B. Birm., Birmingham; J. R. W. Stephens, Manchester; H. Sterne-Howitt, Durham and Guy's; I. H. Syed, Bombay and Manchester; C. H. Terry, B.A. Oxon., Oxford and St. Bartholomew's; J. F. Twort, London; Anna Petronella van Heerden, Amsterdam; S. A. T. Ware, St. Thomas's; H. G. Watters, London; A. S. Westmorland, St. Mary's; E. Williams, L.S.A., L.R.C.P. Edin., London; L. H. Woods, St. Bartholomew's; and E. B. Woolf, London.

UNIVERSITY OF LONDON.—At examinations held recently the following candidates were successful:—

FIRST EXAMINATION FOR MEDICAL DEGREES.

Thomas Adam, St. Bartholomew's Hospital; Dulcie Stapleton Adkins and Doris Elizabeth Alcock, London (Royal Free Hospital) School of Medicine for Women; Christopher Howard Andrewes, St. Bartholomew's Hospital; Marjorie Henrietta S. Auden, Ladies' College, Cheltenham; †Edward Townley Bailey, Epsom College; Frances Sophia Barry and Geraldine Mary Barry, London (Royal Free Hospital) School of Medicine for Women; Davis Evan Bedford, Epsom College; Percy Croad Brett, St. Mary's Hospital; Ralph Vipont Brown, Bootham School; Muriel Burton Buckley, London (Royal Free Hospital) School of Medicine for Women; *†Maurice Danks Cadman, Newport Grammar School; †Frederick Cecil Wray Capps, Epsom College; Arthur Nicholas Carter, University College; Anaple Frances Mary Christie, London (Royal Free Hospital) School of Medicine for Women; Florence Ruth Clulow, Newnham College; John Joseph Coghlan, London Hospital; Julius Cohen, St. Mary's Hospital; Leslie Barrett Cole, Leighton Park School, Reading; Nancy Macnaughton Coutts, Elsie Eleanor Cowperthwaite, and Barbara Cubitt, London (Royal Free Hospital) School of Medicine for Women; Kenneth James Herbert Davies, Guy's Hospital; Arnold Gillett Dobrashian, University College; Kenneth Henry Doouss, St. Bartholomew's Hospital; Edith Monica Down, London (Royal Free Hospital) School of Medicine for Women; Nicholas Bernard Dreyer, Guy's Hospital; Archibald Glen Duncan, London Hospital; Gertrude Rose Stewart Ericson and Edith Marian Evans, London (Royal Free Hospital) School of Medicine for Women; Gertrude Evans, Croydon High School; Hubert Holdrick Fisher, Epsom College; Ena Dorothy Foster and †Ada Marion Freeman, London (Royal Free Hospital) School of Medicine for Women; Leslie French, B.Sc., South-Western Polytechnic Institute; Arthur John Gardham, Bancroft's School; Janet Katharine Gatty, Elizabeth Mai Genge, and †Madeline Giles, London (Royal Free Hospital) School of Medicine for Women; *Humphrey Hart Gleave, University of Leeds; Harry Gerald Goldwater, University College; Nellie Gray, Perse High School; Frances Mary Hamer, Girton College; Katharine May Harbord, London (Royal Free Hospital) School of Medicine for Women; Henry Albert Harris, University College, Cardiff, and private study; Muriel Minnie Harris, London (Royal Free Hospital) School of Medicine for Women; Marjorie Christina Hawkins, University College, Cardiff; Hilda May Haythornthwaite, London (Royal Free Hospital) School of Medicine for Women; Robert Ian Alexander Hicks, Bootham School; William Clifton Vernon Higginson, St. Bartholomew's Hospital; Phyllis Mary Horton, London (Royal Free Hospital) School of Medicine for Women; William David Hoskins, Margaret Olwen Howell, and Gilbert Haywood Howells, University College, Cardiff; Donald Hunter, London Hospital; Margery Kathleen Illingworth, London (Royal Free Hospital) School of Medicine for Women; Marjorie Mary Jefferson, Victoria University of Manchester; Winifred Mary Jenkins, B.Sc., and Doris Eleanor Parker Jolly, London (Royal Free Hospital) School of Medicine for Women; David John Jones, University College, Cardiff; Dilys Menai Jones, University Tutorial College and private study; Winifred Angela Fanny Kann, Dorothy Maud Kemp, and Kathleen Helena Beatrice King, London (Royal Free Hospital) School of Medicine for Women; Cyril John Noël Lambert, St. Paul's School; Joseph Victor Landau, St. Bartholomew's Hospital; Anna Gwenllian Mary Lewis, University College, Cardiff; Reginald Cyril Lightwood, King's College; Margaret Longbottom, London (Royal Free Hospital) School of Medicine for Women; Alan Fleming McGlashan, Epsom College; Alan McKenzie, Guy's Hospital; Rupert Alexander Madgwick, London Hospital; Henrietta Alexandrina Clark Main, London (Royal Free Hospital) School of Medicine for Women; Rex Godfrey Blake Marsh, St. Thomas's Hospital; Dora Mason, London (Royal Free Hospital) School of Medicine for Women; Shafik Fahmy Mina, University College; Iva Clare Marion Moloney and Violet Orr Moore, London (Royal Free Hospital) School of Medicine for Women; Haydn Jones Morris, University College, Cardiff; Herman Mould, University College; David Clark Muir, Middlesex Hospital; Christopher Wesley Narbeth, St. Bartholomew's Hospital; Eva Joyce Newton, London (Royal Free Hospital) School of Medicine for Women; Bertram Sydney Nissé, London Hospital; Sybil Mary Nuttall and Helen O'Brien, London (Royal Free Hospital) School of Medicine for Women; Charles Pye Oliver, Epsom College; Margery Olivier, London (Royal Free Hospital) School of Medicine for Women and Birkbeck College; Alice Owen, London (Royal Free Hospital) School of Medicine for Women; Rupert John Parry, University College, Cardiff; Phœbe Myfanwy Phillips, Tressila Laura Pires, and Alice Dorothy Pocock, London (Royal Free Hospital) School of Medicine for Women; Wilfrid Robert Hollies Pooler, King Edward's High School, Birmingham; Cassie Ethel Pratt and Louise Agnes Procter, London (Royal Free Hospital) School of Medicine for Women; Montague Henry Renall, B.Sc., University College, Cardiff, and private study; Hilda Winifred Richards, London (Royal Free Hospital) School of Medicine for Women; Philip Lawrence Richardson, Guy's Hospital; Isabella McDougall Robertson, London (Royal Free Hospital) School of Medicine for Women; William George Rose, St. Mary's Hospital; Hilda Marjorie Stebbing Russell, London (Royal Free Hospital) School of Medicine for Women; Herbert Leyland Sackett, St. Bartholomew's Hospital; Maud Sanderson and Ena Mildred Sansom, London (Royal Free Hospital) School of Medicine for Women; Margaret Scott-Moncrieff, London (Royal Free Hospital) School of Medicine for Women and University Tutorial College; John St. Clair Shadwell, Epsom College; Efrida Elizabeth Ada Spencer, B.A., London (Royal Free Hospital) School of Medicine for Women; Philip Steinberg, London Hospital; George Horace Tetley Stovin, Epsom College; Helen Caroline

Tompson, London (Royal Free Hospital) School of Medicine for Women; Frederick Henry Wickham Tozer and Mark Treisman, London Hospital; Edith Helen Trimmer, London (Royal Free Hospital) School of Medicine for Women; Eileen Maud Turner, Winchester School for Girls; William Gilbert Desmond H. Urwick, St. Bartholomew's Hospital; Doris Lyne Veale and Norah Walden, London (Royal Free Hospital) School of Medicine for Women; Kenneth Leslie Ward, London Hospital; Mildred Warde, Victoria University of Manchester; Lewis John Watkins, Pontypridd Intermediate School; Agnes Edie Westwood, Agnes Sidney Wilkins, and Ada Kathleen Williams, London (Royal Free Hospital) School of Medicine for Women; David Charles Williams, London Hospital and University Tutorial College; and John Wilson, B.Sc., Birkbeck College and Northern Polytechnic Institute

*Awarded a mark of distinction in Inorganic Chemistry.
†Awarded a mark of distinction in Physics.
‡Awarded a mark of distinction in Biology.

SECOND EXAMINATION FOR MEDICAL DEGREES, PART I.

Iskander Mikhail Abd-El-Said, King's College; Sarah Elizabeth Andrews and Kathleen Ardell, London (Royal Free Hospital) School of Medicine for Women; Moshek Zelmanovitch Bochenek, London Hospital; Muriel Burton Buckley, London (Royal Free Hospital) School of Medicine for Women; Thomas Harold Burlend, B.Sc., private study; Geoffrey Hugh Alexander P. Clavier, London Hospital; Saul Cohen, Guy's Hospital; Alison Margaret Collie, London (Royal Free Hospital) School of Medicine for Women; Philippe Couacaud, Guy's Hospital; Catherine Agnes Cowan, Sarah Helen Davies, and Kathleen Field, B.A., London (Royal Free Hospital) School of Medicine for Women; Isaac Frost and Theodore Franz Handel, King's College; Henry Albert Harris, University College, Cardiff, and private study; Reginald W. Patrick Hosford, St. Bartholomew's Hospital; Winifred Mary Jenkins, B.Sc., London (Royal Free Hospital) School of Medicine for Women; Hassan Kamal, King's College; Mary Elisabeth Kennedy, Girton College; Doris Gertrude Knowles, London (Royal Free Hospital) School of Medicine for Women; *Morris Korn, London Hospital; Albert Ernest Lorenzen, St. Bartholomew's Hospital; Leslie Lyne, Guy's Hospital; Gwendolen Winifred Trymer Lynn, London (Royal Free Hospital) School of Medicine for Women; Aziz Abd el Sayed Mansour, King's College; Margery Olivier, Dorothy Pantin, and Marjorie Pierce, London (Royal Free Hospital) School of Medicine for Women; Olive Gwendoline Potter, Girton College; Cyril Mayberry Probert, University College, Cardiff; Joseph Proujansky, London Hospital; Beatrice Davidine Pullinger, London (Royal Free Hospital) School of Medicine for Women; Henry Elliott Reburn, King's College; Eleanor Margaret Reece and Esther Rickards, London (Royal Free Hospital) School of Medicine for Women; Herbert Leyland Sackett, St. Bartholomew's Hospital; Albert Ernest Sawday, Guy's Hospital; Ernest Livingstone Sergeant, London Hospital; Campbell Shaw, St. Bartholomew's Hospital; William Arthur Merrett Smart, B.Sc., University Tutorial College; Alfred William Lumsden Smith, Derby Technical College and private study; Kathleen Annie Harvey Sykes, University of Liverpool; Arthur Walford Taylor, St. Bartholomew's Hospital; Beriah Melbourne G. Thomas, University College, Cardiff; Raphael Thursz, King's College; Kathleen Mary Tillyard, Newnham College; Madeline Hilda Jane Umpleby, London (Royal Free Hospital) School of Medicine for Women; Alfred Basil Keith Watkins, London Hospital; Anna Braithwaite Whitney, London (Royal Free Hospital) School of Medicine for Women; Kathleen Mary Wilkinson, University of Birmingham; David Charles Williams, London Hospital; Lucy Wills and Grace Elizabeth Winn, London (Royal Free Hospital) School of Medicine for Women; and Jane Edith Wood, University of Leeds.

*Awarded a mark of distinction.

APOTHECARIES' HALL OF IRELAND.—The following gentlemen have been elected members of the Court:—Governor, Mr. T. G. McGrath; Deputy-Governor, Mr. H. W. Mason; Representative on the General Medical Council, Dr. E. Magennis; Directors, Mr. M. J. Burke-Kennedy, Mr. A. Charles, Mr. J. T. D. Crinion, Mr. Delany, Mr. O'C. J. Delahoyde, Mr. W. J. Healy, Mr. M. Keogh, Dr. Magennis, Mr. McGrath, Dr. J. C. McWalter, Dr. Daniel, Mr. Merrin, Dr. O'Sullivan, and Mr. J. Sheppard; Registrar, Mr. Mason.—At examinations held recently the following candidates were successful:—

PRIMARY EXAMINATION.

Chemistry.—D. McLaughlin.
Physics.—J. T. Appleton, J. Corcoran, J. Kennedy, and D. McLaughlin.
Biology.—J. McCarthy, J. Keeney, D. McLaughlin, and M. Ryan.
Completed Examination.—J. T. Appleton, J. Corcoran, D. McLaughlin, and J. McCarthy.

INTERMEDIATE EXAMINATION.

Materia Medica.—J. Warden.

FINAL EXAMINATION.

Medicine.—D. Crowley and J. V. Coghlan.
Surgery.—J. H. McKenna.
Completed examination and granted the Diploma.—J. V. Coghlan and J. H. McKenna.

LONDON HOSPITAL MEDICAL COLLEGE.—Scholarships and prizes were awarded to the following students during the past session:—

Entrance Scholarships.—Buxton Scholarship in Arts, B. S. Nissé; Science Scholarship open to students of Epsom College, A. R. Stearn.
Prizes and Certificates.—Clinical Medicine, prize: A. G. Harsant; honorary certificates: R. G. Simpson and G. P. B. Huddy. Clinical Surgery, prize: A. G. Harsant; honorary certificate: H. W. L. Molesworth. Clinical Obstetrics, prize: N. S. Hewitt and G. Adler (equal, prize divided); honorary certificate: R. G. Simpson. Andrew Clark prize in Clinical Medicine and Pathology, prize: A. G. Harsant; honorary certificates: H. W. L. Molesworth and G. P. B. Huddy. Letheby prizes in Chemistry: (1) Organic Chemistry: H. S. Cohen and J. Fanning (equal, prize divided); (2) Inorganic Chemistry: D. Hunter; honorary certificates: M. Marcus, J. J. Coghlan, and P. Steinberg. Sutton prize in Pathology, prize: R. G. Simpson; honorary certificate: A. G. Harsant. Elementary Clinical Surgery, prizes: M. Shimberg, I. H. Zortman, W. Eidinow, and E. Miller; honorary certificate: C. F. Rainer. Minor Surgery, prizes: J. K. Sanyal, M. W. Bulman, E. L. Sergeant, H. Barker, and G. Newman (equal, prize divided). Practical Anatomy, first prize: M. W. Bulman; second prize: H. M. Gerson and J. Fanning (equal, prize divided). Anderson prizes in Elementary Clinical Medicine, prizes: D. C. Beaumont, I. H. Zortman, and G. R. Woodhead; honorary certificate: R. Theron.

ST. THOMAS'S HOSPITAL.—The following Entrance Science Scholarships have been awarded:—First Scholarship: M. D. Cadman, £150; Second Scholarship: R. G. B. Marsh, £60. Arts: J. G. Churcher, £15 15*s*.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

Medical Arrangements in Mesopotamia.

IN the House of Lords on Tuesday, August 15th, Lord ISLINGTON stated that the chief cause of the sufferings of the troops in Mesopotamia had been lack of transport, but an increase was being provided. He said that in the report of the Vincent Commission special recognition was made of the very valuable services that were rendered by officers and men of the Royal Army Medical Corps and of the Indian Medical Service.

HOUSE OF COMMONS.

WEDNESDAY, AUGUST 9TH.

Petrol for Private Hospitals.

Mr. BROOKES asked the Financial Secretary to the War Office whether his attention had been called to the difficulty of carrying on many of the private hospitals for wounded soldiers owing to the inability of those providing them to obtain the necessary supplies of petrol.—Mr. FORSTER replied: The attention of the War Office has been called to a few instances where inability to obtain necessary supplies of petrol have been alleged, and the hospitals concerned have been informed how to obtain their requirements. The proper course is for hospitals to bring their difficulties in this matter to the notice of the general officers commanding-in-chief of the Commands. It would save time if hospitals would communicate direct with the Commands with whom the decision rests.

THURSDAY, AUGUST 10TH.

Prisoners of War.

Lord ROBERT CECIL (Under Secretary for Foreign Affairs) informed Mr. HUME-WILLIAMS that Switzerland had fixed no maximum number of prisoners of war which she would accept. Time was required to examine the prisoners who were scattered about all over Germany, but it was understood that 764 British prisoners were to arrive in Switzerland on August 11th. The Government were proposing that the Swiss Medical Commissions should visit this country and Germany every quarter.

Unregistered Dentists and Cocaine.

Answering Captain DOUGLAS HALL, Mr. H. SAMUEL (Home Secretary) said: In response to the representations which have been made to me from many quarters of the House, I propose to extend the temporary permit which I have already granted for the purchase of cocaine preparations by unregistered dentists, and in the meantime to make further inquiries into the subject.

The Treatment of Nerve-shaken Soldiers.

Mr. BYRNE asked the Parliamentary Secretary to the Local Government Board whether it was in contemplation to institute convalescent homes, affording cheering surroundings and suitable employment, for uncertifiable nerve-shaken soldiers of the rank and file who, after discharge from the Army, were no longer under military control, and who, being civilians, could not legally be placed under lunacy control without formal certification.—Mr. JAMES HOPE (on behalf of Mr. HAYES FISHER) answered: The Statutory Committee are giving very careful consideration to the question of institutions or some alternative treatment for uncertifiable nerve-shaken soldiers. My right honourable friend is informed that under the arrangements made by the War Office such men are retained in military hospitals as long as they require specialist medical in-patient treatment.

Health of Mesopotamian Force.

Replying to Sir E. CORNWALL, Mr. FORSTER (Financial Secretary to the War Office) said: I cannot, I fear, say that the general health of the troops in Mesopotamia has been good. Every effort is, however, being made to combat the sources of disease, and the Sanitary Committee in the

Mediterranean has been sent to Mesopotamia to assist the local military authorities.

Medical Arrangements at Salonica.

Mr. G. FABER asked the Financial Secretary to the War Office whether there was an insufficiency of sun helmets for our troops at Salonica, and an insufficiency of punkahs for the sick and wounded there.—Mr. FORSTER: No, sir. There is no insufficiency of sun helmets. A sufficient supply to cover issues to the whole force was sent from Egypt last month. No representations have been received as to the insufficiency of punkahs for the sick and wounded.

Mr. SHIRLEY BENN asked whether, considering the disquietude felt throughout the Empire owing to the medical arrangements in the past in Mesopotamia, he could tell the House that the medical arrangements at Salonica was thoroughly satisfactory.—Mr. FORSTER answered: Perhaps I cannot do better than read to the House an extract from a letter written by the Red Cross Commissioner in Macedonia, Sir Courtauld Thomson, who has been familiar with the medical arrangements in France and other theatres since the beginning of the war. He writes as follows under day July 26th:—

> Another striking change here is the progress that has been made in the hospital accommodation and arrangements. I have been in all your general hospitals and many of the casualty clearing stations and field ambulances, and the standard of efficiency seems very high. I have been impressed by the officers commanding. It is a pleasure to see the pride which they take in their own unit and their keenness to try and make it the best of its kind. The last three weeks have been a great strain on everyone, but the medical service has risen splendidly to the occasion.

It is the case that there has been a good deal of malaria amongst the troops in the Struma Valley, but this is now, I am glad to say, lessened.

MONDAY, AUGUST 14TH.

Medical Arrangements in Mesopotamia.

Sir HENRY CRAIK asked the Secretary for India whether he had now communicated with the authorities in India and obtained their consent to the publication of the report of Sir W. Vincent, General Bingley, and Mr. Ridsdale with regard to the medical arrangements and transport in Mesopotamia; and whether the report would be laid upon the table before the recess.—Mr. CHAMBERLAIN said in reply: Copies of the report and of the Commander-in-Chief's Memorandum upon it were despatched from India last month. The appendices, including the evidence, were sent early this month. I am informed by the Viceroy that a general review of the report and its appendices will follow as soon as they have been fully examined. Since the Vincent Commission reported, Parliament has appointed a Statutory Commission to inquire "into the origin, inception, and conduct of the operations of war in Mesopotamia," including *inter alia* "the provision for the sick and wounded," and this Commission is specifically directed "to proceed with all possible expedition to inquire with regard to the provision for the sick and wounded," and to "report the result of their inquiries on this matter as soon as they are completed." All the documents emanating from the Vincent Commission will be laid before the Statutory Commission as soon as they are received, and will, I think, greatly facilitate their task. But meanwhile the matters treated by the Vincent Commission must be considered as still *sub judice*, and their Report cannot be published. The House has the assurance of my right honourable friend, the Secretary of State for War, that everthing possible is being done to remedy the defects disclosed, which were largely, though not entirely, due to difficulties of transport. I should add that I have seen an advance copy of the Report. In addition to criticisms of Indian military organisation—a matter which is now engaging the serious attention of H.M. Government—it mentions certain officers by name as having a grave responsibility in connexion with the state of affairs disclosed by the investigation. For various reasons the Commission was, I believe, unable to examine any of these officers in person. They will, no doubt, be so examined by the Statutory Commission, by whom their case and the measure of their responsibility will be considered. Meanwhile, I may say that the officers so named have vacated their positions, and new appointments have been made to the posts formerly held by them.

Sir E. CARSON: Is the right honourable gentleman aware that there are still unsatisfactory reports coming from Mesopotamia, and can he assure the House that any suggestion made by the Vincent Commission will be at once carried out?—Mr. CHAMBERLAIN, in the course of his reply, said: I am aware that everything is not yet absolutely satisfactory. That was stated the other day by the Secretary for War. Although difficulties of transport have not yet been wholly overcome, and cannot be overcome for some little time, I believe that matters have much improved. The new Director of Medical Services in India went to Mesopotamia on his way to India and dealt with the defects he found, and I believe everything possible is now being done to set things straight.

Sir H. CRAIK: Are we to understand that the only effect of the appointment of a Statutory Commission up to now has been to delay the issue of the report of the Vincent Commission, which was appointed in February last?—Mr. CHAMBERLAIN: The appointment of the Statutory Commission will not be used as a reason for not taking immediate steps when such are shown to be necessary.

Mr. R. MCNEILL: Will the report of the Vincent Commission be published?—Mr. CHAMBERLAIN: The military advisers of the Government have reported that it would be contrary to the public interest to publish the papers in regard to the operations, because they would give information of military value to the enemy. I cannot therefore promise to present any further papers in regard to military affairs or operations until they have been seen and examined by the General Staff.

Medical Women and the War Office.

Mr. DICKINSON asked the Financial Secretary to the War Office whether women doctors were now being employed upon foreign service under the War Office; and, if so, whether they were entitled to receive the same pay as male doctors so employed; whether they were given the same allowances for rations, foreign service, &c., as the men; and if not, what was the reason for this differentiation.—Mr. FORSTER replied: Women doctors will receive the same pay and allowances as male doctors similarly employed.

TUESDAY, AUGUST 15TH.

Medical Services for Munition Workers.

Answering Mr. MACMASTER, Dr. ADDISON (Parliamentary Secretary to the Ministry of Munitions) said: Every effort is being made to provide a suitable medical and nursing service in munition factories so far as may be necessary. Special arrangements are made with regard to workers in explosive and filling factories and for those engaged in other dangerous occupations. In connexion with these further steps are at present under consideration. It is obvious that the means for obtaining these services are affected by the demand for medical services on the part of the military and naval authorities and of the civilian population.

WEDNESDAY, AUGUST 16TH.

Infectious Paralysis in New York.

Commander BELLAIRS asked the President of the Local Government Board what immediate steps were to be taken in regard to the alarming outbreak of infectious paralysis in New York in order to prevent it spreading to this country.—Mr. LONG replied: We are fully acquainted with the facts of this case, with the nature and history of the disease so far as it is known, and with the steps that are being taken to deal with it in New York. Cases of this disease have occurred here for a long period. The ordinary administrative machinery for the protection of this country is sufficient, and no special steps are, I consider, called for in respect of this disease.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

ANDREWS, WILLIAM HENRY, L.R.C.P. & S. Edin., L.F.P.S. Glasg., has been appointed Acting Deputy Medical Officer for the Thirteenth District of the Kingsbridge (Devon) Union.

LEON, GEORGE ALEXANDER, M.A. Oxon., M.D. Brux., L.R.C.P., M.R.C.S., D.P.H., Deputy Acting Medical Officer of Health for Torquay.

PATTERSON, NORMAN, M.B., F.R.C.S., Assistant Surgeon to the Throat and Ear Department at the London Hospital.

SMALE, OSWALD RIDLEY, B.A., M.B., B.C. Cantab., L.R.C.P., M.R.C.S., Acting Deputy Medical Officer for the Linkinhorne District by the Liskeard (Cornwall) Board of Guardians.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BIRKENHEAD UNION INFIRMARY.—Female Resident Assistant Medical Officer. Salary at rate of £250 per annum, with board, &c.

BRISTOL EYE HOSPITAL.—House Surgeon. Salary £80 per annum, with board, &c.

CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST, Victoria Park, E.—Resident Medical Officer. Salary at rate of £200 per annum, with board, &c.

DERBYSHIRE COUNTY COUNCIL.—Two School Medical Officers. Salary £400 per annum.

EVELINA HOSPITAL FOR CHILDREN, Southwark, London, S.E.—House Physician. Salary at rate of £160 per annum, with board, &c.

EWELL COLONY (LONDON COUNTY ASYLUM), Ewell, Surrey.—Locum Tenens Medical Officer. Salary 6 guineas per week, with quarters, board, &c.

GUILDFORD, ROYAL SURREY COUNTY HOSPITAL.—House Surgeon.

HACKNEY UNION INFIRMARY.—Junior Assistant Medical Officer. Salary £250 per annum, with board and furnished apartments.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London.—Casualty Medical Officer. Salary £300 per annum, with luncheon. Also Assistant Casualty Medical Officer for six months. Salary £30, with board, &c.

LEEDS, PUBLIC HEALTH DEPARTMENT.—Female Medical Assistant for Maternity and Child Welfare Work. Salary £350 per annum.

MACCLESFIELD GENERAL INFIRMARY.—Resident House Surgeon. Salary £180, with board, &c.

MAIDSTONE, WEST KENT GENERAL HOSPITAL.—Junior House Surgeon. Salary £125 per annum, with board, &c.

MANCHESTER HOSPITAL FOR CONSUMPTION AND DISEASES OF THE THROAT AND CHEST.—Resident Medical Officer for the In-patient Department, Bowdon, Cheshire. Salary £300 per annum, with board, apartments, and railway contract to Manchester.

MANCHESTER NORTHERN HOSPITAL FOR WOMEN AND CHILDREN, Parkplace, Cheetham Hill road.—Female House Surgeon. Salary £120 per annum, with board, &c.

NORTHAMPTON, COUNTY BOROUGH.—School Medical Officer and Assistant Medical Officer of Health. Salary £350 per annum, rising to £400.

NOTTS COUNTY COUNCIL.—Resident Medical Officer at the Ransom Sanatorium, Sherwood Forest, Mansfield. Salary £250 per annum, with board, &c.

SHEFFIELD, CHILDREN'S HOSPITAL Western Bank.—House Surgeon. Salary £180 per annum, with board, &c.

SHEFFIELD, JESSOP HOSPITAL FOR WOMEN.—Junior Female House Surgeon, unmarried, for Gynæcological and Maternity Departments. Salary £160 per annum, with board, &c.

SHEFFIELD ROYAL HOSPITAL.—House Physician, Casualty Officer, and Assistant House Surgeon. Salaries respectively £140, £130, and £125 per annum, with board, &c.

SOUTH LONDON HOSPITAL FOR WOMEN, South Side, Clapham Common, S.W.—House Physician; also House Surgeon, for six months. Salaries at rate of £100 per annum, with board, &c. Also Temporary Anæsthetists. Honorarium 10s. 6d. per attendance.

THROAT HOSPITAL, Golden-square, W.—Resident House Surgeon.

TUNBRIDGE WELLS GENERAL HOSPITAL.—Two Female House Surgeons. Salary £150 per annum, with board, &c.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Clwtybont, Carnarvon; at Llansawel, Carmarthen; and at Walthamstow, Essex.

Births, Marriages, and Deaths.

BIRTHS.

BOWEN.—On August 12th, at Tower House, Warltersville-road, Crouch End, to Daisy, wife of Lieutenant C. G. Bowen, R.A.M.C., Chatham House, Chislehurst, a son.

COLYER.—On August 14th at Parkhurst, Claygate, Surrey, the wife of Captain Claude G Colyer, R.A.M.C., of a daughter.

FIDDIAN.—On August 12th, at Cambridge, to Captain J. V. Fiddian, R.A.M.C., and Mrs. Fiddian—a daughter.

GLAISTER.—On August 4th, at Weir Cottage, Chertsey, Surrey, the wife of Captain J. Norman Glaister, R.A.M.C., of a son.

HOLLAND.—On August 16th, at 55, Queen Anne-street, W., the wife of Eardley Holland, M.D., of a daughter.

YOUNG.—On August 11th, at St. Brelade's, Woodcote Park-road, Epsom, the wife of Captain John Benson Young, R.A.M.C., of a son.

MARRIAGES.

BONNEY—WILLIAMS.—On August 9th, at St. Mary Abbots, Kensington, Ernest Henry Bonney, M.R.C.S., &c., to Gertrude Mary, daughter of Mr. and Mrs. Edmund G Williams, of Stanford road, Kensington, W.

DAVEY—STAPLES-BROWNE.—On August 12th, at St. Mary's Church, Bampton, Oxfordshire, Thomas Ronald Davey, Lieutenant, R.A.M.C., to Mary Frederica, only daughter of the late Frederick John Staples-Browne, of Launton and Bampton.

PRATT—WINCKLEY.—On August 8th, at the Parish Church, Houghton-on-the-Hill, Leicestershire, by the father of the bride, Captain Oliver Beckley Pratt, R.A.M.C., to Catharine Rose Thorold, eldest daughter of the Rev. S. Thorold Winckley and Mrs. Winckley.

DEATHS.

BEILBY.—Killed in action on April 23rd, 1916, Julius Henry Beilby, M.B., Captain, R.A.M.C.

BURNIE.—Private John Gilchrist Burnie, Royal Fusiliers (University and Public Schools Corps), 24 years of age, killed in action at the taking of Delville Wood. Old Salopian, Hon. Scholar of St. John's College, Oxford. Elder and beloved son of Dr. and Mrs. Gilchrist Burnie, Heaton, Bradford.

CLEMENS.—Killed in action, North Sea, on May 31st, on H.M.S. *Defence*, Frederick William Theodor Clemens, M.B., B.S. Lond., Temporary Surgeon, R.N.

TICEHURST.—On August 10th, at Playden, Charles Sage Ticehurst, M.R.C.P., M.R.C.S., L.R.C.P., L.S.A. Lond., late Surgeon-Major (V.C.), 3rd V.B. (Duke of Connaught's Own) Hants Regiment, aged 69 years.

N.B.—A fee of 5s. is charged for the Insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

STUDENTS' NUMBER OF THE LANCET.

INFORMATION intended for the Students' Number of THE LANCET must be sent WITHOUT DELAY, addressed to the Sub-Editor, and marked on the envelope "Students' Number Only."

CHILDREN'S COUNTRY HOLIDAYS FUND.

To the Editor of THE LANCET.

SIR,—This beautiful sunshine is delightful for children in the country, but these hot summer days are very different in the close courts and back streets for the children of the town. These children for whom the Children's Country Holidays Fund works are the children of our fighting men and of the men who are working to supply them with the means of fighting. This year subscriptions are more than £1000 less than last year. May I beg the help of your readers?

I am, Sir, yours faithfully,

FRANCIS MORRIS,
Chairman of the Fund.

18, Buckingham-street, Strand, W.C., August 12th, 1916.

THE SPELLING OF CINCHONA.

To the Editor of THE LANCET.

SIR,—The interesting letter signed "W." in your issue of August 12th puts forward an explanation for the omission of the letter "h" in the spelling "chinchona," which hardly meets the case, for in the *Farmacopea Ufficiale del Regno d'Italia* we find "*China-Chinæ Cortex; Chinachina—Quinaquina.*" This corresponds more with W. W. Skeat's derivation (Etymological Dictionary): "The form Kina easily produces quinine, and kinken would give both quinquina and (by modification) cinchona." C. Ruiz, writing more from a pharmacological than a philological standpoint, writes: "Linnæus gave the name of cinchona to this tree (C. succirubra), in honour of the Countess del Chinchon, who was reported to have introduced the bark into Europe in 1640." He, however, also says: "Kina means, in the language of the ancient Peruvians, bark, Kina-Kina, a good bark. From this the French have derived their present word Quinquina, the English their Quinine, and the Italians China. ..... In Germany the Italian spelling has been adopted." The theory of Sir Clements R. Markham, withal, holds its ground: "Most unfortunately Linnæus was misinformed as to the name of her whom he desired to honour. ..... Thus misled, Linnæus spelt the word Cinchona (Gen. Pl., 1742) and Cinhona (Gen. Pl. ed. 1767), omitting one or two letters; but the fact that he altered the spelling in his different editions proves beyond any doubt that he desired to spell the word correctly." Unfortunately, Linnæus died before the error was pointed out and corrected, which was done by the Spanish botanists Ruiz and Pavon in 1778, the very year of Linnæus's death. It has also been said that when the English spelling of the word was brought under the notice of the great Swedish botanist he considered that the "h" was excrescent and due to the palatalisation of the letter "c." The introduction of the use of the plant in Europe is incorrectly ascribed to the Lady Ana de Osorio, who in 1615 married Don Luis de Velasco, who on the death of his father became Marquis of Salinas, Lord of Carrion, and a Knight of Santiago. He died in 1619, and in 1621 the Marchioness of Salinas became the wife of Don Luis Geronimo Fernandez de Cabrera y Gobadilla, fourth Count of Chinchon, and on Jan. 14th, 1629, received the seals of office of Viceroy of Peru from his predecessor the Marquis of Guadalcazar. But ere the Count del Chinchon left Spain the beautiful Ana de Osorio died; and the second wife of the Count, Francisca Henriquez de Ribera, who accompanied him to Peru as Vice-Queen, fell ill of malarial fever, was treated with Peruvian bark, obtained from Don Francisco Lopez de Cañizares, who was then Corregidor of Losca, by her physician, Dr. Don Juan de Vega. She made a quick and complete recovery, but the disease recurred in 1639, and she died on her return journey to Spain with her husband, who had resigned his vice-royalty to his successor, the Marquis of Mancera. Thus we find it was the count who was the generous distributer of the famous powder. We must anyhow retain the spelling cinchona, for as Murray (New English Dictionary) writes, "The accepted form is too deeply rooted in botanical and chemical nomenclature to make this [change] expedient."

I am, Sir, yours faithfully,

Dublin, August 12th, 1916. GEORGE FOY

TACHYCARDIA: A PERSONAL EXPERIENCE.

To the Editor of THE LANCET.

SIR,—Thirty-seven years ago I had an attack of tachycardia. I was 20 years of age at the time, living a sedentary life, and working hard as a medical student. The quiet regularity of my life was interrupted in consequence of an invitation to supper at a friend's house. I consumed more food that evening than I was in the habit of doing, and part of the meal was Tangerine oranges. I went to bed at 11 o'clock, and at 2 A.M. I woke feeling very ill and as if about to die. My heart was beating about 200 times per minute. I got up at 8 A.M., and though feeling very feeble was able, by walking slowly, to get to the hospital, where I presented myself to one of the physicians. He informed me that owing to the extreme rapidity of the heart's action he was unable to make a satisfactory examination, but he thought I would soon be well again. Next day I was almost well and the second day I was quite well. This is the only attack I have had. The cause in my case was probably toxæmia and so it probably is in other cases.—I am, Sir, yours faithfully,

August 12th, 1916. M.D.

LONGEVITY AMONG GREAT SOLDIERS.

To the Editor of THE LANCET.

SIR,—I have made a note of the age at death of a few of the well-known great military leaders, as follows: Kitchener, 66; Roberts, 82; Gordon, 52; Havelock, 62; Clive, 49; Wellington, 83; Napoleon, 52; Blucher, 77; Ney, 46; Marlborough, 72; Washington, 67; Grant, 63; Lee, 62; Jackson, 39; Cromwell, 59; Peter the Great, 53; Frederick the Great, 74; Moltke, 91. It would seem that the enormous stress and responsibility of leadership has no direct effect upon longevity, and that violent sudden untimely end is rare, only three, or perhaps four, falling under that category. The ages of the 18 men added together make 1149 years, or an average of almost 64 years each. It will thus be seen that the late Lord Kitchener had on this reckoning two years over the average length of life of the great military commanders. I have intentionally not cited names as far back as Alexander the Great or Julius Cæsar, who lived respectively to 33 and 56. I am, Sir, yours faithfully,

Lon lon, August 14th, 1916. X. Y. Z.

PEMMICAN.

To the Editor of THE LANCET.

SIR,—Can any of your readers inform me of the origin of the word "Pemmican" or "Pemican"? I know that it is North American Indian of some kind, but what it really means I do not know, and the dictionaries I have referred to up to now do not enlighten me. Originally it seems to have been made of dried and pressed venison, with fruits and sugar, &c., made into cakes, but afterwards from beef. I suppose it was made subsequently from beef because venison was not available.—I am, Sir, yours faithfully,

August 12th, 1916. ENQUIRER.

Acting Medical Officer.—We cannot understand how such a position can have arisen, and we believe that if the actual details were sent up the delay in payment would be rectified at once.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, August 16th, 1916.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radiation in Vacuo.	Maximum Temp. in Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Aug. 10	30·136	S.E.	...	102	80	64	61	65	Overcast
,, 11	30·106	N.	0·07	115	80	63	60	65	Fine
,, 12	29·958	S.W.	...	130	83	65	63	68	Cloudy
,, 13	29·710	S.W.	0·03	120	72	63	63	69	Cloudy
,, 14	29·606	S.W.	0·16	124	75	64	63	64	Cloudy
,, 15	29·620	S.W.	0·71	119	68	59	59	62	Cloudy
,, 16	29·716	S.W.	0·13	117	70	53	59	62	Cloudy

The following magazines, journals, &c., have been received:—Modern Hospital, Maryland Medical Journal, Bulletin of the Office International d'Hygiène Publique, London Hospital Gazette, Clinical Medicine, American Journal of the Medical Sciences, La Clinique Ophtalmologique, Medical Review of Reviews, Military Surgeon, Surgery, Gynecology and Obstetrics, American Journal of Roentgenology, Journal of State Medicine, Public Health, Revue d'Hygiène, Dublin Journal of Medical Science, &c.

Medical Diary for the ensuing Week.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. E. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham); Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. N. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).

THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. E. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

THE THROAT HOSPITAL, Golden square, W.

MONDAY.—5.15 P.M., Special Demonstration of Selected Cases.

THURSDAY.—5.15 P.M., Clinical Lecture.

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "To THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

MANAGER'S NOTICES.

THE INDEX AND TITLE-PAGE TO THE LANCET. January to June, 1916.

IN view of the Government restrictions upon the supply of paper, and the shortage of paper quite apart from these restrictions, the Index and the Title-page to the volume of THE LANCET which was completed with the issue of June 24th have been printed separately, and copies have been supplied gratis to those subscribers who have, up to August 17th, intimated to us their wish to receive them. Other subscribers will be similarly supplied, so long as the stock remains unexhausted, on application to the Manager, THE LANCET Office, 423, Strand, London, W.C. Such application should please be sent in at once, direct to the Manager, and not through Agents.

Volumes and Cases.

VOLUMES for the first half of the year 1916 are now ready. Bound in cloth, gilt lettered, price 16*s.*, carriage extra.

Cases for binding the half-year's numbers are also ready. Cloth, gilt lettered, price 2*s.*, by post 2*s.* 4*d.*

To be obtained on application to the Manager, accompanied by remittance.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

THE COLONIAL AND FOREIGN EDITION (printed on thin paper) is published in time to catch the weekly Friday mails to all parts of the world.

TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 4.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

NEWSPAPERS FOR NEUTRAL COUNTRIES.

Newspapers are not at present being sent forward to neutral European countries unless posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. The Publisher of THE LANCET has obtained the required permission, and he will forward copies direct from the Office to any neutral country on receipt of instructions.

Communications, Letters, &c., have been received from—

A.—Messrs. Allen and Hanburys, Lond.; Captain C. H. Attenborough, R.A.M.C.; Association for Moral and Social Hygiene, Lond., Organising Secretary of; Anglo-Egyptian Agency, Lond.; Anglo-French Drug Co., Lond.; Mr. J. W. Arrowsmith, Bristol; Sergeant J. Anthony, Ramsgate; Ardath Tobacco Co., Lond.; Atlanta, U.S.A., Postmaster of; Messrs. Arnold and Sons, Lond.; Major J. M. Atkinson, R.A.M.C.; Sir Clifford Allbutt, Lond.

B.—Messrs. W. H. Bailey and Son, Lond.; Dr. Edwin Baily; Messrs. Butterworth and Co., Lond.; Lieutenant Norman Bradly, R.A.M.C.; Mr. Frank Bawtree, Lond.; Messrs. John Bale, Sons, and Danielsson, Lond.; Bury Infirmary, Hon. Secretary of; Sir Wm. Bennett, Lond.; Brighton Corporation Publicity Department, Director of; Birkenhead Guardians, Clerk to the; Black's Advertising Agency, Lond.; Mr. E. J. Burdon, Lond.; Dr. W. Langdon Brown, Lond.; Dr. A. G. Bateman, Lond.; Mr. Sidney Barwise, Derby; Dr. Dudley Buxton, Lond.; Mrs. Beilby, Bromsgrove; Dr. G. Burton-Brown, Sidmouth; Sir John Byers, Belfast; Bristol Dental Association, Lond., Secretary of; Staff Surgeon S. Bradbury, R.N., Lond.; Boston (U.S.A.) Medical Library, Assistant Librarian of; Mr. Wm. Bryce, Edinburgh.

C.—Dr. S. C. Clapham, Martock; Captain W. T. Chaning-Pearce, R.A.M.C.; Lieutenant A. Chand, I.M.S.; Captain, R.A.M.C., S.R.; Dr. J. R. T. Conner, Lond.; Mr. H. J. Chague, Long Itchington; Messrs. J. and A. Churchill, Lond.; Miss W. Clifford, Lond.; Church Army, Lond., Secretary of; Dr. Celotto, Naples; Dr. J. C. Connell, Kingston, Ontario; Messrs. E. Cook and Co., Lond.; Mr. N. Carson, Oldham; Caterham Sanitarium, Medical Superintendent of; Children's Country Holiday Fund, Lond., Chairman of; Sir William Collins, Lond.; Surgeon Hildred Carlill, R.N.; Mr. Theodore L. Clemens, Tobago; Dr. F. G. Clemow, Lond.; Miss Grace Campling, Bexley; Mr. G. Herbert Colt, Aberdeen.

D.—Mrs. E. A. Dennys, Lond.; Dr. A. F. Dixon, Dublin; Messrs. W. Dawson and Sons, Lond.; Messrs. Dale, Reynolds and Co., Lond.; *The Dental Record*, Lond., Publishers of; Dr. Carlos Duran, San José; Derbyshire County Council, Derby, Medical Officer of Health of; Messrs. J. Dickinson and Co., Lond.

E.—Mr. Arthur Edgelow, Heward, Saskatchewan; Captain T. P. Edwards, R.A.M.C.(T.F.); Mr. W. M. Egglestone, Stanhope.

F.—Messrs. Fletcher, Fletcher, and Co., Lond.; Dr. George Foy, Dublin; Factories, Chief Inspector of, Lond.

G.—Mrs. M. Green, Huntingdon; Mr. E. W. Hey Groves, Clifton; Dr. Norman Gray, Newmarket; Dr. E. S. Glover, Cheltenham; General Education Board, New York; Dr. S. Goto, Lond.; Mrs. M. Grieve, Chalfont St. Peter.

H.—Mr. P. J. Hamfel, New York; Messrs. W. and R. Holmes, Glasgow; Major L. T. Rose Hutchinson, I.M.S.; Captain W. J. Harris, R.A.M.C.; Mr. J. H. Haverson, Carman, Manitoba; Messrs. A. Heywood and Son, Manchester; Mr. R. Hitchins, Lond.; Major Arthur F. Hertz, R.A.M.C.; Mr. John Hickman, Lond.; Mr. Charles J. Heath, Lond.; Dr. John Haddon, Denholm; Lady Horsley, Lond.

I.—Captain Maurice Irvine, I.M.S.; Incorporated Society of Trained Masseuses, Lond., Secretary of.

J.—Dr. A. J. Jex-Blake, Lond.; Dr. B. Jones, Bournemouth.

K.—Miss A. Keilin, Cambridge; Dr. A. Beresford Kingsford, Lond.; Dr. Emmanuel Kondoleon, Athens.

L.—Mr. G. A. Lovett, Harrow; Messrs. H. K. Lewis and Co., Lond.; Dr. G. C. Low, Lond.; Messrs. Lever Bros., Port Sunlight; Dr. A. S. Leyton, Leeds; Local Government Board, Lond.; Corporation of London, Town Clerk of.

M.—Dr. J. L. Martin, Chelmsford; Dr. D. D. Malpas, Boscombe; Captain A. N. Meehan, A.A.M.C.; Manchester Hospital for Consumption, Secretary of; Messrs. C. Mitchell and Co., Lond.; Dr. J. N. Matthews, Whitworth; Messrs. McCaw, Stevenson, and Orr, Belfast; Manchester Clerical, &c., Association; Messrs. Macmillan and Co., Lond.; Mrs. A. McCarthy, Lincoln; Maltine Manufacturing Co., Lond.; Miss Ida Meller, Lond.; Mr. A. Maloine, Paris; Dr. W. Makeig-Jones, Torquay; Mr. J. A. Manton, Sheffield; Mr. R. H. McCoy, Lond.; Messrs. Mayer and Meltzer, Lond.; Mr. J. E. R. McDonagh, Lond.; Metropolitan Hospital Sunday Fund, Secretary of.

N.—Mr. F. Newbery, Edinburgh; Mr. Cyril A. R. Nitch, Lond.; Dr. Sherali K. Nanjiani, Chhota Udepur; Dr. Norton, Folkestone; City of New York Department of Health; Captain Herbert J. Norman, R.A.M.C.; National Medical Union, Lond., Hon. Treasurer of.

O.—Dr. Matthew D. O'Connell, Lond.; Dr. C. O'Gorman, Tintagel.

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